B. R. HERGENHAHN
TRACY B. HENLEY

An Introduction *to the* History *of* Psychology

SEVENTH EDITION

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An Introduction to the History of Psychology

SEVENTH EDITION

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Preface

As with the first six editions of *An Introduction to the History of Psychology*, the primary purpose of the seventh edition is to provide students with a comprehensive overview of the history of psychology. It is our belief that to fully understand the concerns of contemporary psychologists one must know the origins of their research questions, the roots of the theories those questions emerge from, and the evolution of the methods used to answer them.

A new edition always includes updating the scholarly citations throughout the book. Likewise, the images and illustrations were upgraded. Without altering the material covered or the narrative flow, the text was "tightened up," resulting in a reduction of a few pages in most chapters. Specific changes made in this edition include the following:

- *Chapter 1*: The use of Kuhn for understanding the history of psychology is further considered; several theoretical issues that may be difficult for some students are now illustrated with more concrete examples.
- *Chapter 2*: Theory of Mind is introduced to students; the pivotal transition from *mythos* to *logos* in the Ancient world is now referenced throughout the chapter.
- *Chapter 3*: Coverage of Roman life and philosophy is expanded, including coverage of Marcus Aurelius' *Meditations*; the importance of early Christian scholars such as St. Jerome and St. Augustine is re-framed; the transition from the Roman world to the Middle Age is more fully outlined; the supposed anti-intellectualism of the medieval era is clarified; a brief discussion of later medieval science is now included.
- *Chapter 4*: The importance of printing for timely progress in science and philosophy is further underscored; the mention of Machiavelli and other

renaissance notables is expanded; Bacon's idols are illustrated with psychological examples.

- *Chapter 5*: The mention of the Garcia effect is linked to John Garcia; coverage of Bentham and Utilitarianism is expanded; more examples of French sensationalism are provided; the meaning of "positivism" is clarified for students.
- *Chapter 6*: Differences between empiricism and rationalism are illustrated with the "top down" versus "bottom up" metaphor; Leibniz's anticipation of modern computing is noted; the coverage of monadology is simplified; influences of the Scottish School are added; Kant's ideas are grounded in concrete examples and connected to Gestalt and Gibsonian psychology; Hegel's dialectic and his use of "spirit" are further clarified; Herbart is moved to the chapter's end, and is used to discuss the transition from philosophy to psychology.
- *Chapter 7*: Both Kierkegaard and Nietzsche are more explicitly connected with subsequent developments in psychology.
- *Chapter 8*: A brief consideration of early women in science and academia is added to the introduction of Christine Ladd-Franklin; Sheldon's work on body type is now mentioned; the story of Phineas Gage is added; the origins of early electrophysiology are expanded.
- *Chapter 9*: More details in the Clever Hans story and Husserl's biography are provided; connections with the Würzburgers and Ebbinghaus to modern cognitive psychology are noted; coverage of G. E. Müller is now included.
- *Chapter 10*: The significance of Herbert Spencer is highlighted; more depth is given to characters in Darwin's orbit—such as FitzRoy, Huxley, and Wallace; Mendel's contributions in genetics are noted; the Zeitgeist of Darwin and Galton is better illustrated; Galton's connection to eugenics and modern statistics is expanded; the distinction between idiographic and nomothetic is introduced; the legacy of Spearman, Burt, and Terman is updated; the chapter now ends with a section on modern IQ testing (Wechsler) and psychometric contributions.
- *Chapter 11*: Early interest in psychology and religion is noted; more on the actual students of James and Hall is included; there is a substantial reorganization of the Hall section; several additional women involved in early U.S. psychology are now mentioned; additional coverage of functionalism's use of comparative psychology is provided; the positive contributions of James Mark Baldwin are now covered.
- *Chapter 12*: Additional examples of classical conditioning are provided; coverage of Luria and Vygotsky now concludes the "Russian" section; several aspects of Watson's fascinating biography are added; Rhine's parapsychology and Kuo's contributions are now covered in the McDougall section.
- *Chapter 13*: Positivism is more explicitly linked with psychology; the order of presentation is changed, beginning now with Guthrie (to connect with

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Thorndike) and ending with Tolman (to evaluate reinforcement); Hull's anticipation of artificial intelligence and his many influential students are noted; Skinner's time at Indiana as well as a sample of his specific contributions are more fully covered; key concepts from Skinner and Tolman are illustrated with new examples.

- *Chapter 14*: Biographical details are added to Koffka and a connection to Gibson is made; the Gestaltists transition to America is discussed; field theory, Prägnanz, and the connection to phenomenology are clarified; new perceptual examples are provided; the impact of the Gestaltists on modern psychology is covered in greater detail.
- *Chapter 15*: The discussions of witches, hypnotism, and the early biological explanations of abnormality are updated.
- *Chapters 16 and 17*: These chapters are now combined. The influence of Hegel and Nietzsche on Freud is better explained; Freud's use of sexual metaphors is discussed; although the material on Freud is reduced, his substantial influence on psychology is made more clear; Erikson and other developmental matters are expanded; the relationship between Freud and subsequent figures such as Jung and Adler is considered more explicitly; Adler's interest in birth order is noted.
- *Chapter 17*: This chapter now covers Humanistic Psychology. Merleau-Ponty, Sartre, and Camus are now discussed as influences; Jaspers, Frankl, and Boss are discussed as German examples; Buber, Becker, Rotter, and Rychlak are now mentioned; the end matter on comparisons and criticisms is simplified.
- *Chapter 18*: This chapter now covers Psychobiology. Nobel Prize winners are discussed; additional collaborators and students of Lashley are covered; antecedents to Sperry are noted; the heading of behavioral genetics is replaced with a more individualized consideration of ethology, sociobiology, and evolutionary psychology; Chomsky is moved to the cognitive chapter; the end of the chapter now introduces students to more accessible modern neuroscientists.
- *Chapter 19*: This chapter now covers Cognitive Psychology. The start of the chapter remains roughly chronological, although material about people—such as George Miller—is placed together; additional details are added on Bartlett, Piaget, cybernetics, and Bruner; concurrent developments in neuroscience and to behaviorism are noted, and concurrent developments in social psychology are added; the coverage of Neisser and the classic research areas of cognitive psychology is enhanced; the discussion of artificial intelligence is improved and the coverage of connectionism greatly simplified.
- *Chapter 20*: This chapter now covers Contemporary Psychology. Material about the APA and related organizations is updated and streamlined; more on the history of applied psychology is included; Cronbach's extension of Snow's *Two Cultures* is noted; the Wittgenstein section is expanded and Ryle is introduced.

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In memory of Baldwin Ross Hergenhahn, 1934–2007

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1

Introduction

The primary purpose of this book is to examine the origins of modern psychology and to show that most of the concerns of today's psychologists are manifestations of themes that have been part of psychology for hundreds or, in some cases, thousands of years. So what sorts of things do contemporary psychologists study?

- Some seek the biological correlates of mental events such as sensation, perception, or ideation.
- Some concentrate on understanding the principles that govern learning and memory.
- Some seek to understand humans by studying nonhuman animals.
- Some study unconscious motivation.
- Some seek to improve industrial-organizational productivity, educational practices, or child-rearing practices by utilizing psychological principles.
- Some attempt to explain human behavior in terms of evolutionary theory.
- Some attempt to account for individual differences among people in such areas as personality, intelligence, and creativity.
- Some are primarily interested in perfecting therapeutic tools that can be used to help individuals with mental disturbances.
- Some focus on the strategies that people use in adjusting to the environment or in problem solving.
- Some study how language develops and how, once developed, it relates to a variety of cultural activities.
- Some explore computer programs as models for understanding human thought processes.
- Still others study how humans change over the course of their lives as a function of maturation and experience.

And these are just a few of the interests that engage contemporary psychologists. Such diverse activities are characterized by an equally rich diversity of methods and theoretical assumptions about human nature. Our aim then will be to see where these methods and theories began, as well as how they evolved into their present form.

PROBLEMS IN WRITING A HISTORY OF PSYCHOLOGY

Historiography is the study of the proper way to write history. The topic is complex, and there are no final answers to many of the questions it raises. In this section, we offer our thoughts on a few basic questions that must be considered when writing a history.

Where to Start

Literally, *psychology* means the study of the psyche, or mind, and this study is as old as the human species. Ancient peoples, for example, surely studied one another to determine who was reliable and trustworthy, and evidence suggests that they attempted to account for dreams, mental illness, and emotions. Was this psychology?

Or did psychology commence with the first systematic explanations of human cognitive experience, such as those proposed by the early Greeks? Plato and Aristotle, for example, created elaborate theories that attempted to account for such processes as memory, perception, and learning. Is this then the point at which psychology started?

Perhaps psychology came into existence when it emerged as a separate science in the 19th century? This option seems unsatisfactory for two reasons: (1) It ignores the vast philosophical heritage that molded psychology into the type of science that it eventually became; and (2) it omits important aspects of psychology that are outside the realm of science.

Although we will consider very briefly what came before, this book's coverage of the history of psychology starts with the major Greek philosophers whose explanations of human behavior and thought processes are the ones that Western philosophers and psychologists have been reacting to ever since.

What to Include

Typically, in determining what to include in a history of anything, one traces those people, ideas, and events that led to what is important now. This book, too, takes this approach by looking at the way psychology is today and then attempting to show how it became that way. Stocking (1965) calls such an approach to history **presentism**, as contrasted with what he calls **historicism**—the study of the past for its own sake without attempting to relate the past and present. Copleston (2001) describes historicism as it applies to philosophy:

> If one wishes to understand the philosophy of a given epoch, one has to make the attempt to understand the mentality and presuppositions of the men who lived in that epoch, irrespective of whether one shares that mentality and those presuppositions or not. (p. 11)

Presentism attempts to understand the past in terms of contemporary knowledge and standards—which is a practical goal for any textbook. As Lovett (2006) observes, no matter how much historicism is emphasized, presentism cannot be completely avoided:

> To try to understand what historical events were like for those who participated in those events is reasonable and desirable, but to conduct historical research—from the selection of projects to the evaluation of sources to the interpretation of findings—without any regard for present knowledge is counterproductive.… If we ever hope to know where progress has happened and where it has not happened, even if we only want to observe change, some level of presentism is necessary; without the present, the very concept of "history" would be meaningless. (p. 33)

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Although contemporary psychology provides a guide for deciding what individuals, ideas, and events to include in a history of psychology, there remains the question of how much detail to include. Seldom, if ever, is a single individual solely responsible for an idea or a concept. Rather, individuals are influenced by other individuals, who in turn were influenced by other individuals, and so on. A history of almost anything, then, can be viewed as an unending stream of interrelated events. The "great" individuals are typically those who synthesize existing nebulous ideas into a clear, forceful viewpoint.

The usual solution is to omit large amounts of information, thus making the history selective. Typically, only those individuals who did the most to develop or popularize an idea are covered. For example, Charles Darwin is generally associated with evolutionary theory when, in fact, evolutionary theory existed in one form or another for thousands of years. Darwin documented and reported evidence supporting evolutionary theory in a way that made the theory's validity hard to ignore. Thus, although Darwin was not the first to formulate evolutionary theory, he did much to substantiate and popularize it, and we therefore associate it with his name. The same is true for Freud and the notion of unconscious motivation.

This book focuses on those individuals who either did the *most* to develop an idea or, for whatever reason, have become closely associated with an idea. Regrettably, this approach does not do justice to many important individuals who could be mentioned or to other individuals who are lost to antiquity or were not loud or lucid enough to demand historical recognition.

Choice of Approach

Once the material to be included in a history of psychology has been chosen, the choice of an organizational approach remains. One approach is to emphasize the influence of such nonpsychological matters as developments in other sciences, political climate, technological advancement, and economic conditions. Together, these and other factors create a **Zeitgeist**, or a spirit of the times, which many historians consider vital to the full understanding of any historical development. An alternative is to take the **great-person approach** by emphasizing the works of individuals such as Plato, Aristotle, Descartes, Darwin, or Freud. Ralph Waldo Emerson (1841/1981) embraced the great-person approach to history, saying that history "resolves itself very easily into the biography of a few stout and earnest persons" (p. 138). Another possibility is the **historical development approach**, showing how various individuals or events contributed to changes in an idea or concept through the years. For example, one could focus on how the idea of mental illness has changed throughout history.

In his approach to the history of psychology, our discipline's most noted chronicler, E. G. Boring (1886–1968, who served as President of the American Psychological Association in 1928), stressed the importance of the Zeitgeist. Clearly, ideas do not occur in a vacuum. A new idea, to be accepted or even considered, must be compatible with existing ideas. In other words, a new idea will be tolerated only if it arises within an environment that can assimilate it. An idea or viewpoint that arises before people are prepared for it will not be understood well enough to be critically evaluated. The important point here is that validity is not the only criterion by which ideas are judged; psychological and sociological factors are at least as important. New ideas are always judged within the context of existing ideas. If new ideas are close enough to existing ideas, they will at least be understood; whether they are accepted, rejected, or ignored is another matter.

The approach taken in this book is eclectic. That is, this book will show that sometimes the spirit of the times clearly produces great individuals and that sometimes great individuals shape the spirit of their times. At other historical moments, we will see how both great individuals and the general climate of the times evolve to change the meaning of an idea or a concept. In other words, the **eclectic approach** entails using whatever method seems best able to illuminate an aspect of the history of psychology.

WHY STUDY THE HISTORY OF PSYCHOLOGY?

As we noted, ideas are seldom, if ever, born full-blown. Rather, they typically develop over a long period of time. Seeing ideas in their historical perspective allows the student to more fully appreciate the subject matter of modern psychology. However, viewing the problems and questions currently dealt with in psychology as manifestations of centuries-old problems and questions is also humbling and sometimes frustrating. After all, if psychology's problems have been worked on for centuries, should they not be solved by now? Conversely, knowing that our current studies have been shared and contributed to by some of the greatest minds in human history is exciting.

Deeper Understanding

With greater perspective comes deeper understanding. With a knowledge of history, the student need not take on faith the importance of the subject matter of modern psychology. A student with a historical awareness knows where psychology's subject matter came from and why it is important. Just as we gain a greater understanding of a person's current behavior by learning more about that person's past experiences, so do we gain a greater understanding of current psychology by studying its historical origins. Boring (1950) made this point in relation to experimental psychologists:

> The experimental psychologist … needs historical sophistication within his own sphere of expertness. Without such knowledge he sees the present in distorted perspective, he mistakes old facts and old views for new, and he remains unable to evaluate the significance of new movements and methods. In this matter I can hardly state my faith too strongly. A psychological sophistication that contains no component of historical orientation seems to me to be no sophistication at all. (p. ix)

Recognition of Fads and Fashions. While studying the history of psychology, one is often struck by the realization that a viewpoint does not always fade away because it is incorrect; rather, some viewpoints disappear simply because they become unpopular. What is fashionable in psychology varies with the Zeitgeist. For example, when psychology first emerged as a science, the emphasis was on "pure" science—that is, on the gaining of knowledge without any concern for its usefulness. Later, when Darwin's theory became popular, psychology shifted its attention to processes that were related to survival or that allowed humans to live more effective lives. Today, one major emphasis in psychology is on cognitive processes, and that emphasis is due, in part, to recent advances in computer technology.

The illustrious personality theorist Gordon W. Allport (1897–1967; American Psychological Association President in 1939) spoke of fashions in psychology:

> Our profession progresses in fits and starts, largely under the spur of fashion.… We never seem to solve our problems or exhaust our concepts; we only grow tired of them.…
>
> Fashions have their amusing and their serious sides. We can smile at the way bearded problems receive tonsorial transformation.… Modern ethnology excites us, and we are not troubled by the recollection that a century ago John Stuart Mill staked down the term to designate the new science of human character.… Reinforcement appeals to us but not the age-long debate over hedonism.… We avoid the body-mind problem but are in fashion when we talk about "brain models." Old wine, we find, tastes better from new bottles.
>
> The serious side of the matter enters when we and our students forget that the wine is indeed old. Picking up a recent number of the *Journal of Abnormal and Social Psychology*, I discover that … 90 percent of

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> their references [are] to publications of the past ten years.… Is it any wonder that our graduate students reading our journals conclude that literature more than a decade old has no merit and can be safely disregarded? At a recent doctoral examination the candidate was asked what his thesis … had to do with the body-mind problem. He confessed that he had never heard of the problem. An undergraduate said that all he knew about Thomas Hobbes was that he sank with the *Leviathan* when it hit an iceberg in 1912. (1964, pp. 149–151)

With such examples of how research topics move in and out of vogue in science, we see again that "factuality" is not the only variable determining whether to accept an idea. As Zeitgeists change, so does what appears fashionable in science, and psychology is not immune to this process.

Avoiding Repetition of Mistakes. George Santayana, the friend and colleague of America's most famous psychologist, William James (1842–1910), once quipped "Those who cannot remember the past are condemned to repeat it." Such repetition would be bad enough even if it involved only successes, because time and energy would be wasted. It is especially unfortunate, however, if mistakes are repeated. As we will see in this text, psychology has had its share of mistakes and dead ends. One mistake was the embracing of phrenology, the belief that personality characteristics could be understood by analyzing the bumps and depressions on a person's skull. Yet, as we will see in Chapter 8, it was important for psychology that such an effort was made. Still, it would be disastrous if the errors of the past were repeated because of a lack of historical information.

A Source of Valuable Ideas

By studying history, we may discover ideas that were developed at an earlier time but, for whatever reason, remained dormant. The history of science offers several examples of an idea taking hold only after being rediscovered long after it had originally been proposed. This fact fits nicely into the Zeitgeist interpretation of history, suggesting that some conditions are better suited for the acceptance of an idea than others. The notions of evolution, unconscious motivation, and conditioned responses had been proposed and reproposed several times before they were offered in an atmosphere that allowed their critical evaluation. Even Copernicus's "revolutionary" heliocentric theory had been entertained by the Greeks many centuries before he proposed it. A final example is that of lateralization of brain function. Many believe that the idea that the two cerebral hemispheres function in radically different ways is a new one. However, over 100 years ago, Brown-Séquard's article "Have We Two Brains or One?" (1890) was one of many written on the topic. In fact, important scientific ideas can be rejected more than once before they are finally appreciated. Feyerabend (1987) said,

> The history of science is full of theories which were pronounced dead, then resurrected, then pronounced dead again only to celebrate another triumphant comeback. It makes sense to preserve faulty points of view for possible future use. The history of ideas, methods, and prejudices is an important part of the ongoing practice of science and this practice can change direction in surprising ways. (p. 33)

No doubt, many potentially fruitful ideas in psychology's history are still waiting to be tried again under new, perhaps more receptive, circumstances.

And so, instead of asking the question, Why study the history of psychology? it might make more sense to ask, Why not? Many people study U.S. history because they are interested in the United States, and younger members of a family often delight in hearing stories about the early days of the family's elder members. In other words, wanting to know as much as possible about a topic or person of interest, including a topic's or a person's history, is natural. Psychology is not an exception.

WHAT IS SCIENCE?

At various times in history, influential individuals (such as Galileo and Kant) have claimed that psychology could never be a **science** because of its concern with subjective experience. Many natural scientists still believe this, and some psychologists would not argue with them. How a history of psychology is written will be influenced by whether psychology can be considered a science. To answer the question of whether psychology is a science, however, we must first define science.

Science came into existence as a way of answering questions about nature by examining nature directly rather than by depending on church dogma, past authorities, superstition, or abstract thought processes alone. From science's inception, its ultimate authority has been **empirical observation** (that is, the direct observation of nature), but there is more to science than simply observing nature. To be useful, observations must be organized or categorized in some way, and the ways in which they are similar to or different from other observations must be noted. After noting similarities and differences among observations, many scientists take the additional step of attempting to explain what they have observed. Science, then, is often characterized as having two major components: (1) empirical observation and (2) theory. According to Hull (1943), these two aspects of science can be seen in the earliest efforts of humans to understand their world:

> Men are ever engaged in the dual activity of making observations and then seeking explanations of the resulting revelations. All normal men in all times have observed the rising and setting of the sun and the several phases of the moon. The more thoughtful among them have then proceeded to ask the question, "Why? Why does the moon wax and wane? Why does the sun rise and set, and where does it go when it sets?" Here we have the two essential elements of modern science: The making of observations constitutes the empirical or factual component, and the systematic attempt to explain these facts constitutes the theoretical component. As science has developed, specialization, or division of labor, has occurred; some men have devoted their time mainly to the making of observations, while a smaller number have occupied themselves with the problems of explanation. (p. 1)

A Combination of Rationalism and Empiricism. As we will see in Chapters 5 and 6, in the modern era there are two major approaches to understanding where our knowledge comes from: **rationalism** and **empiricism**. The rationalist believes that the validity or invalidity of certain propositions can best be determined by carefully applying the rules of logic. The empiricist maintains that the source of all knowledge is sensory observation. True knowledge, therefore, can be derived from or validated only by sensory experience. Science draws on both positions.

The rational aspect of science prevents it from simply collecting an endless array of disconnected empirical facts. Because the scientist must somehow make sense out of what he or she observes, theories are formulated. A **scientific theory** has two main functions: (1) It organizes empirical observations, and (2) it acts as a guide for future observations. The latter function of a scientific theory generates **confirmable propositions**. In other words, a theory suggests propositions that are tested experimentally. If the propositions generated by a theory are confirmed through experimentation, the theory gains strength; if the propositions are not confirmed by experimentation, the theory loses strength. If the theory generates too many erroneous propositions, it must be either revised or abandoned. Thus, scientific theories must be testable. That is, they must generate hypotheses that can be validated or invalidated empirically. In science, then, the direct observation of nature is important, but such observation is often guided by theory.

The Search for Laws

Another feature of science is that it seeks to discover lawful relationships. A **scientific law** can be defined as a consistently observed relationship between two or more classes of empirical events. For example, when *X* occurs, *Y* also tends to occur. By stressing lawfulness, science is proclaiming an interest in the general case rather than the particular case. Traditionally, science is not interested in private or unique events but in general laws that can be publicly observed and verified. That is, a scientific law is general and, because it describes a relationship between empirical events, it is amenable to **public observation**. The concept of public observation is an important aspect of science. All scientific claims must be verifiable by any interested person. In science, there is no secret knowledge available only to qualified authorities.

There are two general classes of scientific laws. One class is **correlational laws**, which describe how classes of events vary together in some systematic way. For example, exercise tends to correlate positively with health. With such information, only prediction is possible. That is, if we knew a person's level of exercise, we could predict his or her health, and vice versa. A more powerful class of laws is **causal laws**, which specify how events are causally related. For example, if we knew the causes of a disease, we could predict *and* control that disease—as preventing the causes of a disease from occurring prevents the disease from occurring. Thus, correlational laws allow prediction, but causal laws allow prediction and control. For this reason, causal laws are more powerful than correlational laws and thus are generally considered more desirable.

A major goal of science is to discover the causes of natural phenomena. Specifying the causes of natural events, however, is highly complex and usually requires substantial experimental research. It cannot be assumed, for example, that contiguity proves causation. If rain follows a rain dance, it cannot be assumed that the dance necessarily caused the rain. Also complicating matters is the fact that events seldom, if ever, have a single cause; rather, they have multiple causes. Questions such as, What caused World War II? and What causes schizophrenia? are not amenable to one simple answer. Even mundane questions such as, Why did John quit his job? or Why did Jane marry John? are, in reality, enormously complex. In the history of philosophy and science, the concept of causation has been one of the most perplexing (see, for example, Clatterbaugh, 1999; or Meehl, 1978).

The Assumption of Determinism. Because a main goal of science is to discover lawful relationships, science assumes that what is being investigated is lawful. For example, the chemist assumes that chemical reactions are lawful, and the physicist assumes that the physical world is lawful. The assumption that what is being studied can be understood in terms of causal laws is called **determinism**. Taylor (1967) defined determinism as the philosophical doctrine that "states that for everything that ever happens there are conditions such that, given them, nothing else could happen" (p. 359). The determinist, then, assumes that everything that occurs is a function of a finite number of causes and that, if these causes were known, an event could be predicted with complete accuracy. However, knowing *all* causes of an event is not necessary; the determinist simply assumes that they exist and that as more causes are known, predictions become more accurate. For example, almost everyone would agree that the weather is a function of a finite number of variables such as sunspots, high-altitude jet streams, and barometric pressure; yet weather forecasts are always probabilistic because many of these variables change constantly, and others are simply unknown. The *assumption* underlying weather prediction, however, is determinism. All sciences assume determinism.

REVISIONS IN THE TRADITIONAL VIEW OF SCIENCE

The traditional view is that science involves empirical observation, theory formulation, theory testing, theory revision, prediction, control, the search for

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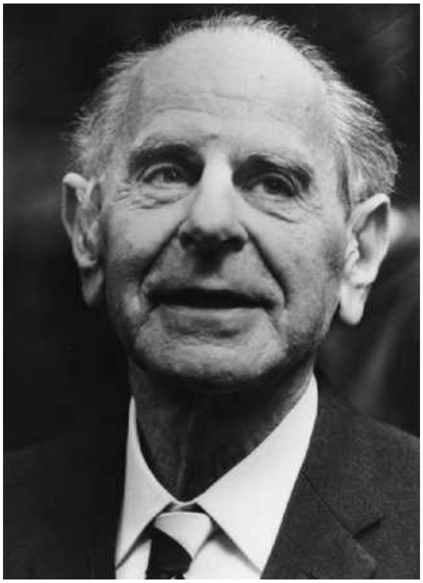
lawful relationships, and the assumption of determinism. Some prominent philosophers of science, however, take issue with at least some aspects of the traditional view of science. Among them are Karl Popper and Thomas Kuhn.

Karl Popper

Karl Popper (1902–1994) disagreed with the traditional description of science in two fundamental ways. First, he disagreed that scientific activity starts with empirical observation. According to Popper, the classic view of science implies that scientists wander around making observations and then attempt to explain what they have observed. Popper (1963/2002a) showed the problem with such a view:

> Twenty-five years ago I tried to bring home [this] point to a group of physics students in Vienna by beginning a lecture with the following instructions: "Take pencil and paper: carefully observe, and write down what you have observed!" They asked, of course, *what* I wanted them to observe. Clearly the instruction, "Observe!" is absurd.… Observation is always selective. It needs a chosen object, a definite task, an interest, a point of view, a problem. (p. 61)



Karl Popper

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So for Popper, scientific activity starts with a problem, and the problem determines what observations scientists will make. The next step is to propose solutions to the problem (conjectures) and then attempt to find fault with the proposed solutions (refutations). Popper saw scientific method as involving three stages: problems, theories (proposed solutions), and criticism.

Principle of Falsifiability. According to Popper, the demarcation criterion that distinguishes a scientific theory from a nonscientific theory is the **principle of falsifiability**. A scientific theory must be refutable. Contrary to what many believe, if any conceivable observation can be made to agree with a theory, the theory is weak, not strong. Popper spent a great deal of time criticizing the theories of Freud and Adler for exactly this reason. This is because those theories are vague, so no matter what happens verification can likely be claimed. Popper contrasted such theories with that of Einstein, which predicts precisely what should or should not happen if the theory is correct. Thus, Einstein's theory, unlike the theories of Freud and Adler, was refutable and therefore scientific.

For Popper, for a theory to be scientific, it must make **risky predictions**—predictions that run a real risk of being incorrect. Theories that do not make risky predictions or that explain phenomena *after* they have already occurred are, according to Popper, not scientific. In addition to vagueness, another major problem with many psychological theories (such as Freud's and Adler's) is that they engage more in **postdiction** (explaining phenomena after they have already occurred) than in prediction.

According to Popper, it is a theory's incorrect predictions, rather than its correct ones, that cause scientific progress. This idea is nicely captured by Marx and Goodson (1976):

> In real scientific life theories typically contribute not by being right but by *being wrong*. In other words, scientific advance in

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> theory as well as experiments tends to be built upon the successive corrections of many errors, both small and large. Thus the popular notion that a theory must be right to be useful is incorrect. (p. 249)

In Popper's view, *all* scientific theories will eventually be found to be false and will be replaced by more adequate theories; it is always just a matter of time. For this reason, the highest status that a scientific theory can attain, according to Popper, is *not yet disconfirmed*. Popperian science is an unending search for better and better solutions to problems or explanations of phenomena. Brett (1912–1921/1965) made this point effectively:

> We tend to think of science as a "body of knowledge" which began to be accumulated when men hit upon "scientific method." This is a superstition. It is more in keeping with the history of thought to describe science as the myths about the world which have not yet been found to be wrong. (p. 37)

Does this mean Popper believed that nonscientific theories (including those of Freud and Adler) are useless? Absolutely not! He said,

> Historically speaking all—or very nearly all—scientific theories originate from myths, and … a myth may contain important anticipations of scientific theories …
> I thus [believe] that if a theory is found to be non-scientific, or "metaphysical"… it is not thereby found to be unimportant, or insignificant, or "meaningless," or "nonsensical." (1963/2002a, p. 50)

Popper used falsification as a demarcation between a scientific and a nonscientific theory but not between a useful and useless theory. Many theories in psychology fail Popper's test of falsifiability either because they are stated in such general terms that they are confirmed by almost any observation or because they engage in postdiction rather than prediction. Such theories lack scientific rigor but are still often found to be useful.

Thomas Kuhn

Until recently, it was widely believed that the scientific method guaranteed objectivity, and that science produced information in a steady, progressive way. It was assumed that the world consists of knowable "truths," and that following scientific procedures allowed science to systematically approximate those truths. In other words, scientific activity was guided by the **correspondence theory of truth**, "the notion that the goal, when evaluating scientific laws or theories, is to determine whether or not they correspond to an external, mind-independent world" (Kuhn, 2000a, p. 95). **Thomas Kuhn (1922–1996)** changed that conception of science by showing science to be a highly subjective enterprise.

Paradigms and Normal Science. According to Kuhn, in the physical sciences, one viewpoint is commonly shared by most members of a science. In physics or chemistry, for example, most researchers share a common set of assumptions or beliefs about their subject matter. Kuhn refers to such a widely accepted viewpoint as a **paradigm**. Kuhn defines the term *paradigm* as "the entire constellation of beliefs, values, techniques, and so on shared by the members of a given [scientific] community" (1996, p. 175). For those scientists accepting a given paradigm, it becomes *the* way of looking at and analyzing the subject matter of their science. Once a paradigm is accepted, the activities of those accepting it become a matter of exploring the implications of that paradigm. Kuhn referred to such activities as **normal science**. Normal science provides what Kuhn called a "mopping-up" operation for a paradigm. While following a paradigm, scientists explore in depth the problems defined by the paradigm and utilize the methods suggested by the paradigm while exploring those problems.

Kuhn likened normal science to **puzzle solving**. Like puzzles, the problems of normal science have an assured solution, and there are "rules that limit both the nature of acceptable solutions and the steps by which they are to be obtained"

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(Kuhn, 1996, p. 38). Kuhn saw neither normal science nor puzzle solving as involving much creativity: "Perhaps the most striking feature of … normal research problems … is how little they aim to produce major novelties, conceptual or phenomenal" (1996, p. 35). Although a paradigm restricts the range of phenomena scientists examine, it does guarantee that certain phenomena are studied thoroughly.

> By focusing attention upon a small range of relatively esoteric problems, the paradigm forces scientists to investigate some part of nature in a detail and depth that would otherwise be unimaginable.… During the period when the paradigm is successful, the profession will have solved problems that its members could scarcely have imagined and would never have undertaken without commitment to the paradigm. And at least part of that achievement always proves to be permanent. (Kuhn, 1996, pp. 24–25)

That is the positive side of having research guided by a paradigm, but there is also a negative side. Although normal science allows for the thorough analysis of the phenomena on which a paradigm focuses, it blinds scientists to other phenomena and perhaps better explanations for what they are studying.

MIT News Office

Thomas S. Kuhn

> Mopping-up operations are what engage most scientists throughout their careers. They constitute what I am here calling normal science. Closely examined, whether historically or in the contemporary laboratory, that enterprise seems an attempt to force nature into the preformed and relatively inflexible box that the paradigm supplied. No part of the aim of normal science is to call forth new sorts of phenomena; indeed, those that will not fit the box are often not seen at all. Nor do scientists normally aim to invent new theories, and they are often intolerant of those invented by others. Instead, normal-scientific research is directed to the articulation of those phenomena and theories that the paradigm already supplies. (Kuhn, 1996, p. 24)

A paradigm, then, determines what constitutes a research problem *and* how the solution to that problem is sought. In other words, a paradigm guides all of the researcher's activities, both theoretical and methodological. More important, however, is that researchers become emotionally involved in their paradigm—they define their careers by the work they do within the paradigm. It becomes part of their lives and is therefore very difficult to give up.

How Sciences Change. How do scientific paradigms change? According to Kuhn, not very easily. First, there must be persistent observations that a currently accepted paradigm cannot explain; these are called **anomalies**. Usually, a single scientist or a small group of scientists will eventually propose an alternative viewpoint, one that will account for most of the phenomena that the prevailing paradigm accounts for and will also explain the anomalies. Kuhn indicated that there is typically great resistance to the new paradigm and that converts to it are won over very slowly. In time, however, the new paradigm wins out and displaces the old one. According to Kuhn, this describes what happened when Einstein challenged the Newtonian conception of the universe. Now, the Einsteinian paradigm is generating its own normal science and will continue to do so until it is overthrown by another paradigm.

Kuhn portrayed science as a method of inquiry that combines the objective scientific method and the emotional makeup of the scientist. Science progresses, according to Kuhn, because scientists are forced to change their belief systems; and belief systems are very difficult to change, whether for a group of scientists or for anyone else.

The Stages of Scientific Development. According to Kuhn, the development of a paradigm that comes to dominate a science occurs over a long period of time. Prior to the development of a paradigm, a science typically goes through a **preparadigmatic stage** during which a number of competing viewpoints exist. During this period, which Kuhn referred to as prescientific, a discipline is characterized by a number of rival camps or schools, a situation contrary to unification and that results in, essentially, random fact gathering. Such circumstances continue to exist until one school succeeds in defeating its competitors and becomes a paradigm. At this point, the discipline becomes a science, and a period of normal science begins. The normal science generated by the paradigm continues until the paradigm is displaced by a new one, which in turn will generate its own normal science. Kuhn saw sciences as passing through three distinct stages: the preparadigmatic stage, during which rival camps or schools compete for dominance of the field; the **paradigmatic stage**, during which the puzzle-solving activity called normal science occurs; and the **revolutionary stage**, during which an existing paradigm is displaced by another paradigm.

Paradigms and Psychology

Mayr (1994) argues that several paradigms have always existed simultaneously in biology, and there was a kind of Darwinian competition for the acceptance of ideas among them. Successful ideas, no matter what their source, survived, and unsuccessful ideas did not. This natural selection among ideas is called evolutionary epistemology, and it conflicts with Kuhn's concept of paradigm shifts.

What has all of this to do with psychology? One certainly *could* fit the history of psychology into Kuhnian terms. For example, suggesting that American psychology's first school, structuralism, was displaced by Watson's behaviorism, which following a cognitive revolution was in turn itself displaced. Although that can be a useful heuristic for looking at psychology in the 20th century, it is not clear that it is true.

Staats describes psychology as a preparadigmatic discipline (Staats, 1981, 1989, 1991). The various schools of the 20th century then are viewed as competing systems looking to gain the status of a paradigm. Even today we see camps labeled behavioristic, cognitive, psychobiological, psychoanalytic, evolutionary, humanistic, etc. Others (for example, Henley, 1989; Koch, 1981, 1993; Leahey, 1992; Royce, 1975; Rychlak, 1975) do not agree that psychology is a preparadigmatic, but claim that it is a discipline different from the sciences that Kuhn considered. Similar to Mayr's (1994) observation about biology, perhaps psychology has always had several coexisting paradigms (or, at least, themes or research traditions). For these historians of psychology, there has never been, nor has there been a need for, a Kuhnian type of revolution. Some even view the coexistence of several paradigms in psychology as healthy, productive, and perhaps inevitable because of the nature of psychology's diverse subject matter. Following that idea, in this text it is assumed that psychology is a multiparadigmatic discipline rather than a discipline at the preparadigmatic stage of development.

Popper versus Kuhn

A major source of disagreement between Kuhn and Popper concerns Kuhn's concept of normal science. As we have seen, Kuhn says that once a paradigm has been accepted, most scientists busy themselves with research projects dictated by the paradigm—that is, doing normal science.

For Popper, what Kuhn called normal science is not science at all. Scientific problems are not like puzzles, because there are no restrictions either on what counts as a solution or on what procedures can be followed in solving a problem. According to Popper, scientific problem solving is a highly imaginative, creative activity, nothing like the puzzle solving described by Kuhn. Furthermore, for Kuhn, science cannot be understood without considering psychological and sociological factors. For him, there is no such thing as a neutral scientific observation. Observations are always made through the lens of a paradigm. In Popperian science, such factors are foreign; problems exist, and proposed solutions either pass the rigorous attempts to refute them or they do not. Thus, Kuhn's analysis of science stresses convention and subjective factors, and Popper's analysis stresses logic and creativity.

D. N. Robinson (1986) suggests that the views of both Kuhn and Popper may be correct: "In a conciliatory spirit, we might suggest that the major disagreement between Kuhn and Popper vanishes when we picture Kuhn as describing what science has been historically, and Popper asserting what it ought to be" (p. 24). However, it should be noted that there is a basic difference between Popper's and Kuhn's philosophies of science. Popper believed that there are truths about the physical world that science can approximate. In other words, Popper accepted the correspondence theory of truth. Kuhn, on the other hand, rejected this theory, saying instead that the paradigm accepted by a group of scientists creates the "reality" they explore. For this reason, Kuhn "was led to the radical view that truth itself is relative to a paradigm" (Okasha, 2002, p. 88).

Other philosophers claim that any attempt to characterize the nature of "science" is misguided. For them, there is no one scientific method or principle, and any description of science must focus on the creativity and determination of individual scientists. In this spirit, the illustrious physicist Percy W. Bridgman (1955) said that scientists do not follow "any prescribed course of action.… Science is what scientists do and there are as many scientific methods as there are individual scientists" (p. 83). In his book *Against Method: Outline of an Anarchistic Theory of Knowledge*, **Paul Feyerabend (1924–1994)** aligned himself with those philosophers of science who claim that scientists follow no prescribed set of rules. In fact, he said that whatever rules do exist must be broken in order for scientific progress to occur. Feyerabend (1975) summarized this position as follows:

> *My thesis is that anarchism helps to achieve progress in any one of the senses one cares to choose.* Even a law-and-order science will succeed only if anarchistic moves are occasionally allowed to take place. (p. 27)
>
> For nobody can say in abstract terms, without paying attention to idiosyncrasies of person and circumstances, what precisely it was that led to progress in the past, and nobody can say what moves will succeed in the future. (p. 19)

In his book *Farewell to Reason*, Feyerabend (1987) continued his "anarchistic" description of science:

> There is no one "scientific method," but there is a great deal of opportunism; anything goes—anything, that is, that is liable to advance knowledge as understood by a particular researcher or research tradition. In practice science often oversteps the boundaries some scientists and philosophers try to put in its way and becomes a free and unrestricted inquiry. (p. 36)
>
> Successful research does not obey general standards; it relies now on one trick, now on another, and the moves that advance it are not always known to the movers. A theory of science that devises standards and structural elements of *all* scientific activities and authorizes them by reference to some rationality-theory may impress outsiders—but it is much too crude an instrument for the people on the spot, that is, for scientists facing some concrete research problem. (p. 281)

Even within the views of Popper, Kuhn, and Feyerabend, many traditional aspects of classical science remain. We still view empirical observation as the ultimate test, we still seek lawful relationships, formulate and test our theories, and assume a deterministic outcome. For an excellent historical review of conceptions of science and a discussion of those that currently exist, see *Science Wars: What Scientists Know and How They Know It* by S. L. Goldman (2006).

IS PSYCHOLOGY A SCIENCE?

The scientific method has been used with great success in psychology. Experimental psychologists have demonstrated lawful relationships between classes of environmental events (stimuli) and classes of behavior, and they have devised rigorous, refutable theories to account for those relationships. The theories of Hull and Tolman are clear examples of psychology as science, and there are many others. Today, scientific psychologists work hand in hand with chemists and neurologists who are attempting to determine the biochemical correlates of memory and other cognitive processes. Still other psychological scientists are working with evolutionary biologists and geneticists in an effort to understand origins of human social behavior. In fact, we can safely say that scientifically oriented psychologists have provided a great deal of useful information in every major area of psychology—for example, learning, perception, memory, personality, intelligence, motivation, and psychotherapy. However, although some psychologists are certainly scientists, many are not.

Determinism

Scientifically oriented psychologists are willing to assume determinism while studying humans. Although all determinists believe that all behavior is caused, there are different types of determinism. **Biological determinism** emphasizes the importance of physiological conditions or genetic predispositions in the explanation of behavior. For example, evolutionary psychologists claim that much human behavior, as well as that of nonhuman animals, reflects dispositions inherited from our long evolutionary past. **Environmental determinism** stresses the importance of environmental stimuli as determinants of behavior. The following illustrates the type of determinism that places the cause of human behavior in the environment:

> Behavior theory emphasizes that environmental events play the key role in determining human behavior. The source of action lies not inside the person, but in the environment. By developing a full understanding of how environmental events influence behavior, we will arrive at a complete understanding of behavior. It is this feature of behavior theory—its emphasis on environmental events as the determinants of human action—which most clearly sets it apart from other approaches to human nature.… If behavior theory succeeds, our customary inclination to hold people responsible for their actions, and look inside them to their wishes, desires, goals, intentions, and so on, for explanations of their actions, will be replaced by an entirely different orientation … one in which responsibility for action is sought in environmental events. (Schwartz and Lacey, 1982, p. 13)

Sociocultural determinism is a form of environmental determinism, but rather than emphasizing the physical stimuli that cause behavior, it emphasizes the cultural or societal rules, regulations, customs, and beliefs that govern human behavior. For example, Erikson (1977) referred to culture as "a version of human existence." To a large extent, what is considered desirable, undesirable, normal, and abnormal is culturally determined; thus, culture acts as a powerful determinant of behavior.

Other determinists claim that behavior is caused by the interaction of biological, environmental, and sociocultural influences. In any case, determinists believe that behavior is caused by

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antecedent events and set as their job the discovery of those events. It is assumed that, as more causes are discovered, human behavior will become more predictable and controllable. In fact, the prediction and control of behavior is usually recognized as an acceptable criterion for demonstrating that the causes of behavior have been discovered.

Although determinists assume that behavior is caused, they generally agree that it is virtually impossible to know *all* causes of behavior. There are at least two reasons for this limitation. First, behavior typically has many causes. As Freud said, much behavior is *overdetermined*; that is, behavior is seldom, if ever, caused by a single event or even a few events. Rather, a multitude of interacting events typically causes behavior. Second, some causes of behavior may be fortuitous. For example, a reluctant decision to attend a social event may result in meeting one's future spouse. About such meetings Bandura (1982) says, "Chance encounters play a prominent role in shaping the course of human lives." He gives the following example:

> It is not uncommon for college students to decide to sample a given subject matter only to leave enrollment in a particular course to the vagaries of time allocation and course scheduling. Through this semifortuitous process some meet inspiring teachers who have a decisive influence on their choice of careers. (p. 748)

Fortuitous circumstances do not violate a deterministic analysis of behavior; they simply make it more complicated. By definition, fortuitous circumstances are not predictable relative to one's life, but when they occur they are causally related to one's behavior.

Fortuity is but one of the factors contributing to the complexity of the causation of human behavior. Determinists maintain that it is the complexity of the causation of human behavior that explains why predictions concerning human behavior must be probabilistic. Still, determinists believe that as our knowledge of the causes of behavior increases, so will the accuracy of our predictions concerning that behavior.

What biological, environmental, and sociocultural determinism all have in common is that the determinants of behavior they emphasize are directly measurable. Genes, environmental stimuli, and cultural customs are all accessible and quantifiable and thus represent forms of **physical determinism**. However, some scientific psychologists emphasize the importance of cognitive and emotional experience in their explanation of human behavior. For them, the most important determinants of human behavior are subjective and include a person's beliefs, emotions, sensations, perceptions, ideas, values, and goals. These psychologists emphasize **psychical determinism** rather than physical determinism. Among the psychologists assuming psychical determinism are those who stress the importance of mental events of which we are conscious and those, like Freud, who stress the importance of mental events of which we are not conscious.

Besides accepting some type of determinism, scientific psychologists also seek general laws, develop theories, and use empirical observation as their ultimate authority in judging the validity of those theories. Psychology, as it is practiced by these psychologists, is definitely scientific, but not all psychologists agree with their assumptions and methods.

Indeterminism and Nondeterminism

Some psychologists believe that human behavior is determined but that the causes of behavior cannot be accurately measured. This belief mirrors Heisenberg's **uncertainty principle**. The German physicist Werner Karl Heisenberg (1901–1976) found that the very act of observing an electron influences its activity and casts doubt on the validity of the observation. Heisenberg concluded that nothing can ever be known with certainty in science. Translated into psychology, this principle says that, although human behavior is indeed determined, we can never learn some causes of behavior, because in attempting to observe them we change them. In this way, the experimental setting itself may act as a confounding variable in the search for the causes of human behavior. Psychologists who accept this viewpoint believe that there are specific causes of behavior but that they cannot be accurately known. Such a position is called **indeterminism**. Another example of indeterminacy is Immanuel Kant's (1724–1804) conclusion that a science of psychology is impossible because the mind could not be objectively employed to study itself. MacLeod (1975) summarized Kant's position as follows:

> Kant challenged the very basis of a science of psychology. If psychology is the study of "the mind," and if every observation and every deduction is an operation of a mind which silently imposes its own categories on that which is being observed, then how can a mind turn in upon itself and observe its own operations when it is forced by its very nature to observe in terms of its own categories? *Is there any sense in turning up the light to see what the darkness looks like?* (p. 146)

Some psychologists completely reject science as a way of studying humans. These psychologists, usually working within either a humanistic or an existential paradigm, believe that the most important causes of behavior are self-generated. For this group, behavior is freely chosen and thus independent of physical or psychical causes. This belief in **free will** is contrary to the assumption of determinism, and therefore the endeavors of these psychologists are nonscientific. Such a position is known as **nondeterminism**. For the nondeterminists, because the individual freely chooses courses of action, he or she alone is responsible for them.

Determinism and Responsibility. Although a belief in free will leads naturally to a belief in personal responsibility, one version of psychical determinism also holds humans responsible for their actions. William James (1884/1956) distinguished between hard determinism and soft determinism. With hard determinism, he said, the causes of human behavior are thought to function in an automatic, mechanistic manner and thus render the notion of personal responsibility meaningless. With soft determinism, however, cognitive processes such as intentions, motives, beliefs, and values intervene between experience and behavior. The soft determinist sees human behavior as resulting from thoughtful deliberation of the options available in a given situation. Because rational processes manifest themselves prior to actions, the person bears responsibility for those actions. Although soft determinism is still determinism, it is a version that allows uniquely human cognitive processes into the configuration of the causes of human behavior. Soft determinism, then, offers a compromise between hard determinism and free will—a compromise that allows for human responsibility. (For examples of contemporary psychologists who accept soft determinism, see Bandura, 1989; Robinson, 1985; and Sperry, 1993.)

Whether we consider psychology a science depends on which aspect of psychology we focus on. One highly respected psychologist and philosopher of science answers the question of whether psychology is a science in a way that stresses psychology's nonscientific nature:

> Psychology is misconceived when seen as a coherent science or as any kind of coherent discipline devoted to the empirical study of human beings. Psychology, in my view, is not a single discipline but a collection of studies of varied cast, some few of which may qualify as science, whereas most do not. (Koch, 1993, p. 902)

Sigmund Koch (1917–1996) argued that psychology should embrace both science and the humanities in its effort to understand humans. Koch's more comprehensive view of psychology has been highly influential, and most of the May 2001 issue of *American Psychologist* explores its implications.

Importantly, we should not judge psychology harshly because some of its aspects are not scientific or even antiscientific. Just because a thing is not scientific does not minimize its value. Great novels

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and works of art are not scientific, but clearly have value. Governments and legal systems are not grounded in science, but provide much good. Science as we now know it is relatively new, whereas the subject matter of most, if not all, sciences is very old. What is now studied scientifically was once studied philosophically or theologically, as Popper noted. First came the nebulous categories that were debated for centuries in a nonscientific way. This debate readied various categories of inquiry for the fine tuning that science provides.

In psychology today, there is inquiry on all levels. Some concepts have a long philosophical heritage and are ready to be treated scientifically; other concepts are still in their early stages of development and are not ready for scientific treatment; and still other concepts, by their very nature, may never be amenable to scientific inquiry. All these levels and types of inquiry appear necessary for the growth of psychology, and all sustain one another.

PERSISTENT QUESTIONS IN PSYCHOLOGY

The questions that psychology is now attempting to answer are often the same questions it has been trying to answer from its inception. In many cases, only the methods for dealing with these persistent questions have changed. We have already encountered one of psychology's persistent questions: Is human behavior freely chosen or is it determined? Another concerns the essential aspect of human nature.

A theory of human nature attempts to specify what is universally true about humans. That is, it attempts to specify what all humans are equipped with at birth. One question of interest here is, How much of our animal heritage remains in human nature? For example, are we inherently aggressive? Yes, say the Freudians; no, say members of the humanistic camp, such as Rogers and Maslow. Or perhaps our nature is neither good nor bad but shaped by experience, as behaviorists like Watson and Skinner claim? In large part, how this question is answered is determined by how one understands mind and body to be related.

Mind and Body

The question of whether there is a mind and, if so, how it is related to the physical body is as old as psychology itself. Every psychologist must address this question either explicitly or implicitly. Through the years, almost every conceivable position has been taken on the mind-body relationship. Some psychologists attempt to explain everything in physical terms; for them, even so-called mental events are ultimately just physics and chemistry. These individuals are called **materialists** because they believe that matter is the only reality, and therefore everything in the universe, including the cognitions and behavior of organisms, must be explained in terms of matter. They are also called **monists** because they attempt to explain everything in terms of one type of reality—matter. Other psychologists are at the opposite extreme, saying that even our so-called physical reality results from perceived ideas. These individuals are called **idealists**, and they, too, are monists because they attempt to explain everything in terms of consciousness. Many psychologists, however, accept the existence of both physical and mental events and assume that the two are governed by different principles. Such a position is called dualism. The **dualist** believes that there are physical events and mental events. Once it is assumed that both a physical and a mental realm exist, the question becomes how the two are related.

Types of Dualism. One form of dualism, called **interactionism**, claims that the mind and body interact. That is, the mind influences the body, and the body influences the mind. According to this interactionistic conception, the mind is capable of initiating behavior. This was the position taken by Descartes. The psychoanalysts, from Freud to the present, are also interactionists. For them, many bodily ailments are *psychogenic*, caused by mental events such as conflict, anxiety, or frustration.

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Another popular way of explaining mind-body relationships is through **emergentism**, which claims that mental states emerge from physical brain states. A common analogy is how the unique qualities of water (its wetness, its boiling point, its density, etc.) emerge when hydrogen and oxygen combine—elements without those qualities. The emergent properties of water then are analogous to mind, as something that arises from the right sort of physical substrate (brain). One kind of emergentism claims that once mental events emerge from brain activity, the mental events can influence subsequent brain activity and thus behavior. Because of the postulated reciprocal influence between brain activity (body) and mental events (mind), this kind of emergentism represents interactionism. Nobel-prize winner Roger Sperry (1993), for example, advocated this kind of emergentism.

Another form of emergentism that is not interactionist is **epiphenomenalism**. According to the epiphenomenalist, the brain causes mental events, but mental events cannot cause behavior. In this view, mental events are simply by-products (epiphenomena) of brain processes with no ability to exert any influence.

Another dualist position is that an environmental experience causes both mental events and bodily responses *simultaneously* and that the two are totally independent of each other. This position is referred to as **psychophysical parallelism**. According to a related dualist position, called **double aspectism**, a person cannot be divided into a mind and a body but is a unity that simultaneously experiences events physiologically and mentally. Just as heads and tails are two aspects of a coin, mental events and physiological events are two aspects of a person. Mind and body do not interact, nor can they ever be separated. They are simply two sides of each experience we have as humans. Other dualists maintain that there is a **preestablished harmony** between bodily and mental events. That is, the two types of events are different and separate but are coordinated by some external agent—for example, God. Finally, in the 17th century, Nicolas de Malebranche suggested that when a desire occurs in the mind, God causes the body to act. Similarly, when something happens to the body, God causes the corresponding mental experience. Malebranche's position on the mind-body relationship is called **occasionalism**.

All the preceding positions on the mind-body problem are represented in psychology's history, and we will therefore encounter them throughout this text. Figure 1.1 shows Chisholm's whimsical summary of the proposed mind-body relationships.

Mechanism versus Vitalism. Related to mind-body, another persistent question in psychology's history is whether human behavior is completely explicable in terms of mechanical laws. According to **mechanism**, the behavior of all organisms, including humans, can be explained in the same way that the behavior of any machine can be—in terms of its parts and the laws governing those parts. To the mechanist, explaining human behavior is like explaining the behavior of a clock except that humans are more complex. In contrast, according to **vitalism**, life can never be completely reduced to material things and mechanical laws. Living things contain a vital force that does not exist in inanimate objects. In ancient times, this force was referred to as a soul or spirit, and it was its departure from the body that caused death. The mechanism-vitalism debate is prominently featured in psychology's history, and we will encounter it in various forms throughout this text.

Nativism versus Empiricism

To what extent are human attributes such as intelligence inherited and to what extent are they determined by experience? The **nativist** emphasizes the role of inheritance in his or her explanation of the origins of various human attributes, whereas the empiricist emphasizes the role of experience. Those who consider some aspect of human behavior instinctive or who take a stand on human nature as being good, bad, aggressive, gregarious, and so on are also nativists. Empiricists, on the other hand, claim that humans are the way they are largely because of their experiences.

Most, if not all, psychologists now concede that human behavior is influenced by both experience and inheritance; what differentiates nativists from

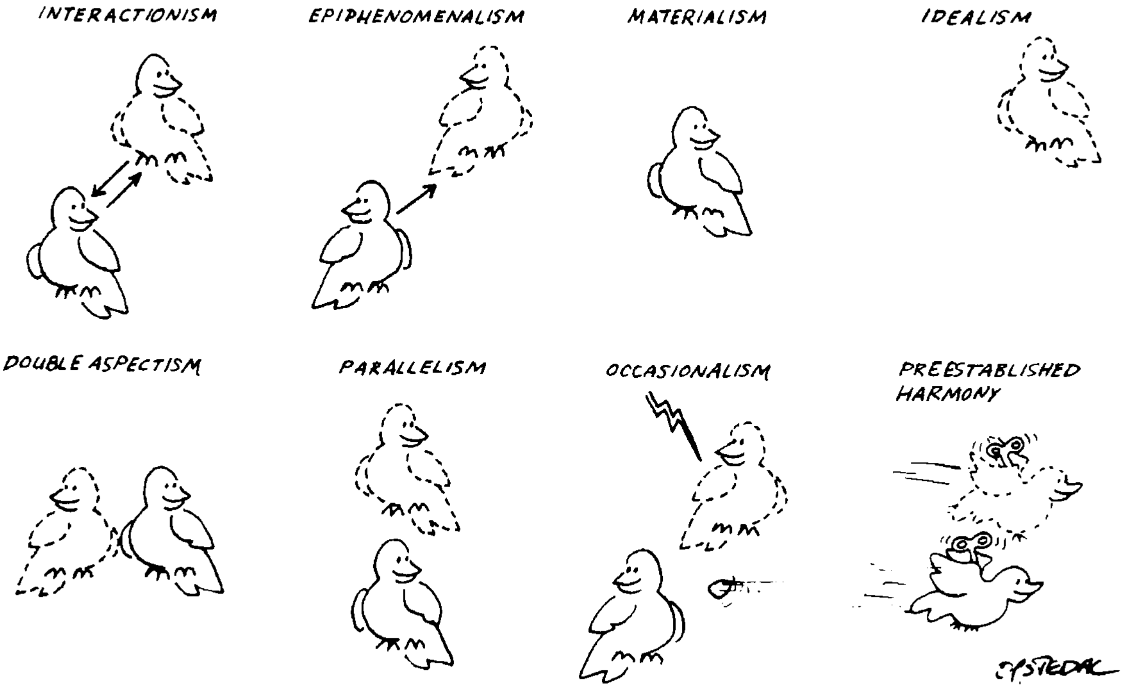

FIGURE 1.1

Chisholm's depictions of various mind–body relationships. The bird drawn with the broken line represents the mind, and the bird drawn with the unbroken line represents the body.

Redrawn from Taylor (1963, p. 130). Used by permission of Roderick M. Chisholm.

empiricists is the emphasis they place on one or the other. Consider an all-state basketball player. How much of her success comes from innate genetic potential, and how much was based on years of excellent coaching, access to adequate practice facilities, having good team-mates, and so on? In most cases, behavior is clearly the product of both nature (the innate) and nurture (experience).

Rationalism versus Irrationalism

Rationalistic explanations of human behavior usually emphasize the importance of logical, systematic, and intelligent thought processes. Perhaps for this reason, most of the great contributions to mathematics have been made by philosophers in the rationalistic tradition, such as Descartes and Leibniz. Rationalists tend to search for the universal principles that govern events in the empirical world. Most of the early Greek philosophers were rationalists, and some went so far as to equate wisdom with virtue. When one knows the truth, said Socrates, one acts in accordance with it. Thus, wise humans are good humans. The greatest passion, to the Greeks, was the passion to know. There are other passions, of course, but they should be rationally controlled. Western philosophy and psychology has, to a large extent, perpetuated the glorification of the intellect at the expense of emotional experience.

It was not always agreed, however, that the intellect is the best guide for human thought and behavior. At various times in history, human emotion has been appreciated more than the human reason. This was the case during the early Christian era, during the Renaissance, and at various other times under the influence of existential philosophy and psychology. All these viewpoints stress human feeling over dry human reasoning and are therefore referred to as "irrational."

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Any explanation of human behavior that stresses unconscious determinants is also irrational. The psychoanalytic theories of Freud and Jung, for example, exemplify **irrationalism** because they claim that the true causes of behavior are unconscious and as such cannot be experienced rationally. The tension between conceptions of humans that stress intellect (reason) and those that stress the emotions or the unconscious mind (spirit) has appeared throughout psychology's history and still manifests itself in contemporary psychology.

How Are Humans Related to Nonhuman Animals?

The major question here is whether humans are qualitatively or quantitatively different from other animals. If the difference is quantitative (one of degree), then at least something (and perhaps much) can be learned about humans by studying other animals. The school of behaviorism relied heavily on animal research and maintained that the same principles governed the behavior of both

"THEN, AS YOU CAN SEE, WE GIVE THEM SOME MULTIPLE CHOICE TESTS."

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nonhumans and humans. Therefore, the results of animal research could be readily generalized to the human level.

Representing the other extreme are the humanists who believe that people are qualitatively different from other animals, and therefore nothing important about us can be learned by studying nonhuman animals. Humans, they say, are the only animals that freely choose their courses of action and are therefore morally responsible for that action. It thus makes sense to judge human behavior as good or bad. Similar judgments of animal behavior are meaningless. Without the ability to reason and to choose, there can be no guilt. Holding in abeyance the cartoon, most psychologists fall somewhere between the two extremes, saying that some things can be learned about humans by studying other animals, but that some things cannot.

What Is the Origin of Human Knowledge?

The study of knowledge is called **epistemology** (from the Greek *episteme*, meaning "to know or understand"). The epistemologist asks such questions as, What can we know? What are the limits of knowledge? and How is knowledge attained? Psychology has always been involved in epistemology because one of its major concerns has been determining how humans gain information about themselves and their world. The radical empiricist insists that all knowledge is derived from sensory experience, which is somehow registered and stored in the brain. The rationalist agrees that sensory information is often, if not always, the first step in attaining knowledge, but argues that the mind must then actively transform this information in some way before knowledge is attained. Some nativists would say that some knowledge is innate. Plato and Descartes, for example, believed that many ideas were a natural part of the mind.

In answering epistemological questions, the empiricists postulate a **passive mind** that records physical experiences as mental images, recollections, and associations. Physical experiences that occur consistently in some particular pattern will be represented in that pattern and will tend to be recalled in that pattern. Rationalists, however, postulate an **active mind** that interacts with the data from experience, even transforming it. Whereas a passive mind is seen as representing physical reality, the active mind is seen as a mechanism by which physical reality is organized, pondered, understood, or valued. For the rationalist, the mind adds something to our mental experience that is not found in our perceptual experience. If two people look at an ornate chess board mid game and one is a master whereas the other does not know how to play, do they see the same thing? The empiricist would rightly say yes, they are looking at the same object. But the rationalist would also insist that one can see an inevitable checkmate in two moves, and the other just a collection of toy soldiers scattered across a pretty table.

For the empiricist, then, knowledge consists of the accurate description of physical reality as it is revealed by sensory experience and recorded in the mind. For the rationalist, knowledge consists of concepts and principles that can be attained from a pondering, active mind. For some nativists, at least some knowledge is inherited as a natural component of the mind. The empiricist, rationalist, and nativist positions, and various combinations of them, have always been part of psychology; in one form or another, they are still with us today. In this text, we will see how these philosophical positions have manifested themselves in various ways throughout psychology's history.

Objective versus Subjective Reality

The difference between what is really present physically (physical or objective reality) and what we actually experience mentally (subjective or phenomenal reality) has been an issue at least since the early Greeks. Some accept **naive realism**, saying that what we experience mentally is exactly the same as what is present physically. Many others, however, say that at least something is lost or gained in the translation from physical to phenomenal experience. A discrepancy between the two types of experience

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can exist if the sense receptors can respond only partially to what is physically present—for example, to only certain sounds or colors. A discrepancy can also exist if information is lost or distorted as it is being transmitted from the sense receptors to the brain. Also, the brain itself can transform sensory information, thus creating a discrepancy between physical and phenomenal reality. The important question here is, Given the fact that there is a physical world and a psychological world, how are the two related? A related question is, Given the fact that all we ever experience directly is our own sensations and perceptions, how can we come to know anything about the physical world that presumptively gave rise to them? We are confronted here with the problem of **reification**, or the tendency to believe that because something has a name it also has an independent existence. J. S. Mill (1843/1874) described this fallacy:

> The fallacy may be enunciated in this general form—Whatever can be thought of apart exists apart: and its most remarkable manifestation consists in the personification of abstractions. Mankind in all ages have had a strong propensity to conclude that wherever there is a name, there must be a distinguishable separate entity corresponding to the name; and every complex idea which the mind has formed for itself by operating upon its conceptions of individual things, was considered to have an outward objective reality answering to it. (p. 527)

Throughout human history, entities such as souls, minds, gods, demons, spirits, and selves have been imagined and then assumed to exist. Of course, in more recent times, procedures have been available to determine whether imagined entities have referents in the empirical world. As we have seen, scientific theory attempts to correlate words and symbols with empirical observations. In the case of reification, however, the relationship between the imagined and the real is simply assumed to exist. The tendency toward reification is a powerful and persistent one, and we will encounter it often.

The Problem of the Self

Our physical experiences are highly diverse, and yet we experience unity among them. Also, we grow older, gain and lose weight, change locations, exist in different times; yet with all of this and more, our life's experiences have continuity. We perceive ourselves as the same person from moment to moment, from day to day, and from year to year even though little about us remains the same. The question is, What accounts for the unity and continuity of our experience? Through the centuries, entities such as a soul or a mind have been proposed. More recently, the self has been the most popular proposed organizer of experience.

The self has often been viewed as having a separate existence of its own, as is implied by the phrase "I said to myself." Besides organizing one's experiences and providing a sense of continuity over time, the self has often been endowed with other attributes, such as being the instigator and evaluator of action. Other experiences that contribute to the belief in an autonomous self include the feeling of intentionality or purpose in one's thoughts and behavior; the awareness of being aware; the ability to selectively direct one's attention; and moments of highly emotional, insightful experiences. As we will see, to postulate a self with autonomous powers creates a number of problems that psychology has struggled with through the years and still does. Clearly, whether an autonomous self or mind is proposed as the organizer of experience or as the instigator of behavior, one is confronted with the mind-body problem.

Universalism versus Relativism

Throughout the histories of philosophy, science, and psychology there have been individuals who sought, and some who claimed to have discovered, universal truths about the world in general or about people in particular. The goal of such universals is to describe the general laws, principles, or essences that govern the world and our perception of it. Likewise, there have been individuals who claim that such universal truths either do not exist or, if they do, that they cannot be known. These

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relativists say that humans always influence what they observe and, therefore, the search for universals that exist independently of human existence must be in vain. Instead, they say all "truth" must be relative to individual or group perspectives. For them, there is no one Truth, only truths.

This debate concerning **universalism** versus **relativism** was first articulated by the early Greek philosophers (see Chapter 2) and has been an ongoing theme in the history of philosophy and psychology. In Chapter 20, we will see that the tension between modernism and postmodernism in contemporary philosophy and psychology is the most current manifestation of the conflict between universalism and relativism.

We have already seen one example of this debate when we reviewed Popper's and Kuhn's philosophies of science. Although Popper believed scientific knowledge must always be tentative, he assumed the existence of a physical world and that knowledge of that world can be approximated by engaging in the kind of science he described. Popper, then, was a universalist. On the other hand, Kuhn believed that scientific activity is always guided by a paradigm, and any conclusions reached about the world tend to be in accordance with the dictates of that paradigm. In other words, according to Kuhn, conceptions of the world change as paradigms change, and therefore it makes no sense to talk about truth that exists independently of a paradigm. Kuhn was a relativist.

SUMMARY

Traditionally, science was viewed as starting with empirical observation and then proceeding to the development of theory. Theories were then evaluated in terms of their ability to generate predictions that either were or were not supported by experimental outcome. Theories that generated predictions that were confirmed became stronger, and those making erroneous predictions were revised or abandoned. Popper disagreed with the traditional view of science, saying that scientific activity does not start with empirical observation but with a problem of some type that guides the scientist's empirical observations. Furthermore, Popper maintained that to be classified as scientific, a theory must specify in advance the observations that, if made, would refute it. What distinguishes a scientific theory from a nonscientific theory is the principle of falsifiability.

Kuhn also disagreed with the traditional view of science. Kuhn's analysis of science stresses sociological and psychological factors. At any given time, scientists accept a general framework within which they perform their research, a framework Kuhn called a paradigm. A paradigm determines what constitutes research problems and how those problems are solved. For Popper, scientific activity is guided by problems, whereas for Kuhn, scientific activity is guided by a paradigm that scientists believe to be true. For Popper, science involves creative problem solving; for Kuhn, it involves puzzle solving. According to Kuhn, scientific progress occurs in three stages: the preparadigmatic, the paradigmatic, and the revolutionary. A fundamental distinction between Popper's and Kuhn's conceptions of science is reflected in the fact that Popper accepted the correspondence theory of truth and Kuhn did not. Other philosophers of science, such as Feyerabend, claim that it is misleading to characterize science or scientific method in any particular way. For them, science is what scientists do.

Some aspects of psychology are scientific, and some are not. Psychologists who are willing to assume physical or psychical determinism while studying humans are more likely to have a scientific orientation than are those who are unwilling to make that assumption. Nondeterminists assume that human behavior is freely chosen and therefore not amenable to traditional scientific analysis. The indeterminist believes that human behavior is determined, but that the determinants of behavior cannot always be known. Psychology need not apologize for its nonscientific aspects because those aspects have often made significant contributions to our understanding. Also, in some cases, the concepts developed by

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nonscientific psychologists are later fine-tuned by psychologists using the scientific method.

Many questions that have persisted throughout psychology's history were summarized, including the following: To what extent are humans free, and to what extent is their behavior determined by knowable causes? What is the nature of human nature? How are the mind and body related? To what extent are human attributes determined by heredity (nativism) as opposed to experience (empiricism)? Can human behavior be completely understood in terms of mechanistic principles, or must some additional vitalistic principle be postulated? To what extent is human behavior rational as opposed to irrational? How are humans related to nonhuman animals? What is the origin of human knowledge? What is the difference between what exists physically and what is experienced mentally, and how is this difference to be known and accounted for? How has the concept of self been used throughout psychology's history to account for one's continuity of experience over time, and what are the problems associated with the concept of self? Are there knowable universal truths about the world in general or about people in particular, or must truth always be relative to individual or group perspectives?

DISCUSSION QUESTIONS

1. Discuss the choices that must be made before writing a history of psychology. Include in your answer a distinction between presentism and historicism.
2. What is gained by studying the history of psychology?
3. Summarize the major characteristics of science.
4. Discuss why psychology can be described both as a science and as a nonscience. Include in your answer the characteristics of science that some psychologists are unwilling to accept while studying humans.
5. In what ways did Popper's view of science differ from the traditional view?
6. According to Popper, what are the two primary reasons that theories such as those of Freud and Adler are unscientific?
7. Summarize Kuhn's views on how sciences change. Include in your answer the definitions of the terms *preparadigmatic*, *paradigm*, *normal science*, and *scientific revolution*.
8. Within the realm of science, what is the correspondence theory of truth? Explain why it can be said that Popper accepted this theory and Kuhn did not.
9. Summarize Feyerabend's view of science.
10. Should psychology aspire to become a single-paradigm discipline? Defend your answer.
11. Is psychology a science? Defend your answer.
12. Define the terms physical determinism, psychical determinism, indeterminism, and nondeterminism.
13. Distinguish between hard determinism and soft determinism.
14. Summarize the various proposed answers to the mind-body problem. Include in your answer definitions of the terms monism, dualism, materialism, idealism, emergentism, interactionism, psycho-physical parallelism, epiphenomenalism, preestablished harmony, double aspectism, and occasionalism.
15. Discuss the nativist and empiricist explanations of the origin of human attributes.
16. Discuss rationalism and irrationalism as they apply to explanations of human behavior.
17. Describe how both the empiricist and the rationalist would explain how we gain knowledge.
18. Discuss the problems involved in discovering and explaining discrepancies that may exist between what is physically before us and what we experience subjectively. Define and give an example of reification.
19. Summarize the debate between universalism and relativism concerning the nature of truth.

SUGGESTIONS FOR FURTHER READING

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GLOSSARY

Active mind A mind that transforms, interprets, understands, or values physical experience. The rationalists assume an active mind.

Anomalies Persistent observations that cannot be explained by an existing paradigm. Anomalies eventually cause one paradigm to displace another.

Biological determinism The type of determinism that stresses the biochemical, genetic, physiological, or anatomical causes of behavior.

Causal laws Laws describing causal relationships. Such laws specify the conditions that are necessary and sufficient to produce a certain event. Knowledge of causal laws allows both the prediction and control of events.

Confirmable propositions Within science, propositions capable of validation through empirical tests.

Correlational laws Laws that specify the systematic relationships among classes of empirical events. Unlike causal laws, the events described by correlational laws do not need to be causally related. One can note, for example, that as average daily temperature rises, so does the crime rate without knowing (or even caring) if the two events are causally related.

Correspondence theory of truth The belief that scientific laws and theories are correct insofar as they accurately mirror events in the physical world.

Determinism The belief that everything that occurs does so because of known or knowable causes and that if these causes were known in advance, an event could be predicted with complete accuracy. Also, if the causes of an event were known, the event could be prevented by preventing its causes. Thus, the knowledge of an event's causes allows the prediction and control of the event.

Double aspectism The belief that bodily and mental events are inseparable because they are two aspects of every experience.

Dualist Anyone who believes that there are two aspects to humans, one physical and one mental.

Eclectic approach Taking the best from a variety of viewpoints. The approach to the history of psychology taken in this text is eclectic because it combines coverage of great individuals, the development of ideas and concepts, the spirit of the times, and contributions from other disciplines.

Emergentism The contention that mental processes emerge from brain processes. The interactionist form of emergentism claims that once mental states emerge, they can influence subsequent brain activity and thus behavior. The epiphenomenalist form claims that emergent mental states are behaviorally irrelevant.

Empirical observation The direct observation of that which is being studied in order to understand it.

Empiricism The belief that the basis of all knowledge is experience.

Environmental determinism The type of determinism that stresses causes of behavior that are external to the organism.

Epiphenomenalism The form of emergentism that states that mental events emerge from brain activity but that mental events are subsequently behaviorally irrelevant.

Epistemology The study of the nature of knowledge.

Feyerabend, Paul (1924–1994) Argued that science cannot be described by any standard set of rules, principles, or standards. In fact, he said, history shows that

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scientific progress occurs when individual scientists violate whatever rules, principles, or standards existed at the time.

Free will *See* **Nondeterminism**.

Great-person approach The approach to history that concentrates on the most prominent contributors to the topic or field under consideration.

Historical development approach The approach to history that concentrates on an element of a field or discipline and describes how the understanding or approach to studying that element has changed over time. An example is a description of how mental illness has been defined and studied throughout history.

Historicism The study of the past for its own sake, without attempting to interpret and evaluate it in terms of current knowledge and standards, as is the case with presentism. (*See also* **Presentism**.)

Historiography The study of the proper way to write history.

Idealists Those who believe that ultimate reality consists of ideas or perceptions and is therefore not physical.

Indeterminism The contention that even though determinism is true, attempting to measure the causes of something influences those causes, making it impossible to know them with certainty. This contention is also called Heisenberg's uncertainty principle.

Interactionism A proposed answer to the mind-body problem, maintaining that bodily experiences influence the mind and that the mind influences the body.

Irrationalism Any explanation of human behavior stressing determinants that are not under rational control—for example, explanations that emphasize the importance of emotions or unconscious mechanisms.

Kuhn, Thomas (1922–1996) Believed that the activities of members of a scientific community are governed by a shared set of beliefs called a paradigm. This paradigmatic, or normal, science continues until an existing paradigm is displaced by another paradigm. (*See also* **Paradigm**, **Normal science**, and **Puzzle solving**.)

Materialists Those who believe that everything in the universe is material (physical), including those things that others refer to as mental.

Mechanism The belief that the behavior of organisms, including humans, can be explained entirely in terms of mechanical laws.

Monists Those who believe that there is only one reality. Materialists are monists because they believe that only matter exists. Idealists are also monists because they believe that everything, including the "material" world, is the result of human consciousness and is therefore mental.

Naive realism The belief that what one experiences mentally is the same as what is present physically.

Nativist Anyone who believes that important human attributes such as intelligence are largely inherited.

Nondeterminism The belief that human thought or behavior is freely chosen by the individual and is therefore not caused by antecedent physical or mental events.

Normal science According to Kuhn, the research activities performed by scientists as they explore the implications of a paradigm.

Occasionalism The belief that the relationship between the mind and body is mediated by God.

Paradigm A viewpoint shared by many scientists while exploring the subject matter of their science. A paradigm determines what constitutes legitimate problems and the methodology used in solving those problems.

Paradigmatic stage According to Kuhn, the stage in the development of a science during which scientific activity is guided by a paradigm. That is, it is during this stage that normal science occurs. (*See also* **Normal science**.)

Passive mind A mind that simply reflects cognitively one's experiences with the physical world. The empiricists assume a passive mind.

Physical determinism The type of determinism that stresses material causes of behavior.

Popper, Karl (1902–1994) Saw scientific method as having three components: problems, proposed solutions to the problems (theories), and criticisms of the proposed solutions. Because all scientific theories will eventually be found to be false, the highest status any scientific theory can attain is not yet disconfirmed. (*See also* **Principle of falsifiability** and **Risky predictions**.)

Postdiction An attempt to account for something after it has occurred. Postdiction is contrasted with prediction, which attempts to specify the conditions under which an event that has not yet occurred will occur.

Preestablished harmony The belief that bodily events and mental events are separate but correlated because both were designed to run identical courses.

Preparadigmatic stage According to Kuhn, the first stage in the development of a science. This stage is characterized by warring factions vying to define the subject matter and methodology of a discipline.

Presentism Interpreting and evaluating historical events in terms of contemporary knowledge and standards.

Principle of falsifiability Popper's contention that for a theory to be considered scientific it must specify the observations that, if made, would refute the theory. To be considered scientific, a theory must make risky predictions. (*See also* **Risky predictions**.)

Psychical determinism The type of determinism that stresses mental causes of behavior.

Psychophysical parallelism The contention that experiencing something in the physical world causes bodily and mental activity simultaneously and that the two types of activities are independent of each other.

Public observation The stipulation that scientific laws must be available for any interested person to observe. Science is interested in general, empirical relationships that are publicly verifiable.

Puzzle solving According to Kuhn, normal science is like puzzle solving in that the problems worked on are specified by a paradigm, the problems have guaranteed solutions, and certain rules must be followed in arriving at those solutions.

Rationalism The philosophical belief that knowledge can be attained only by engaging in some type of systematic mental activity.

Reification The belief that abstractions for which we have names have an existence independent of their names.

Relativism The belief that because all experience must be filtered through individual and group perspectives, the search for universal truths that exist independently of human experience must be in vain. For the relativist, there is no one truth, only truths.

Revolutionary stage According to Kuhn, the stage of scientific development during which an existing paradigm is displaced by a new one. Once the displacement is complete, the new paradigm generates normal science and continues doing so until it too is eventually displaced by a new paradigm.

Risky predictions According to Popper, predictions derived from a scientific theory that run a real chance of showing the theory to be false. For example, if a meteorological theory predicts that it will rain at a specific place at a specific time, then it must do so or the theory will be shown to be incorrect.

Science Traditionally, the systematic attempt to rationally categorize or explain empirical observations. Popper described science as a way of rigorously testing proposed solutions to problems, and Kuhn emphasized the importance of paradigms that guide the research activities of scientists. Feyerabend believed it is impossible to give a generalized conception of science or scientific method.

Scientific law A consistently observed relationship between classes of empirical events.

Scientific theory Traditionally, a proposed explanation of a number of empirical observations; according to Popper, a proposed solution to a problem.

Sociocultural determinism The type of environmental determinism that stresses cultural or societal rules, customs, regulations, or expectations as the causes of behavior.

Uncertainty principle *See* **Indeterminism**.

Universalism The belief that there are universal truths about ourselves and about the physical world in general that can be discovered by anyone using the proper methods of inquiry.

Vitalism The belief that life cannot be explained in terms of inanimate processes. For the vitalist, life requires a force that is more than the material objects or inanimate processes in which it manifests itself. For there to be life, there must be a vital force present.

Zeitgeist The spirit of the times.

2

Ancient Greece

THE ANCIENT WORLD

Imagine living about 15,000 years ago. What would your life be like? It seems safe to say that in your lifetime you would experience most of the following: lightning, thunder, rainbows, the phases of the moon, death, birth, illness, dreams (including nightmares), meteors, eclipses of the sun or moon, and perhaps one or more earthquakes, tornadoes, floods, droughts, or volcanic eruptions. Because these events would touch your life directly, it seems natural that you would want to account for them in some way, but how? Many of these events—for example, lightning—cannot be explained by average citizens even today. But we have faith that scientists can explain such events, and we are comforted and less fearful. However, as an early human, you would have no such scientific knowledge available. As mentioned in Chapter 1, thoughtful humans have always made empirical observations and then attempted to explain those observations. Although observation and explanation became key components of science, the explanations early humans offered were anything but scientific.

Animism and Anthropomorphism

Humans' earliest attempts to explain natural events involved projecting human attributes onto nature. For example, the sky or earth could become angry or could be tranquil, just as a person could. Looking at all of nature as though it were alive is called **animism**, and the projection of human attributes onto nature is called **anthropomorphism**; both were involved in early attempts to make sense out of life (Cornford, 1957; Murray, 1955). Early humans made no distinctions between animate (living) and inanimate objects or between material and immaterial things.

Another approach used to explain the world assumed that a ghost or spirit dwelt in everything, including humans, and that these spirits were as real as anything else. The events in both nature and human conduct were explained as the whims of the spirits that resided in everything. The word *spirit* is derived from the Latin word for "breath." Breath (later spirit, soul, psyche, or ghost) is what gives things life, and when it leaves a thing, death results. This vital spirit can sometimes leave the body and return, as was assumed to be the case in dreaming. Also, because one can dream of or think of a person after his or her biological death, it was assumed that the person must still exist, for it was believed that something that could be thought of must exist (reification). With this logic, anything the mind could conjure up was assumed to be real; therefore, imagination and dreams provided an array of demons, spirits, monsters, and, later, gods, who lurked behind all natural events.

Magic

Because an array of spirits with human qualities was believed to exist, attempting to communicate with the spirits and otherwise influence them was a natural impulse. If, for example, a spirit was providing too much or too little rain, humans made attempts to persuade the spirit to modify its influence. Similarly, a sick person was thought to be possessed by an evil spirit, which had to be coaxed to leave the body or be driven out. Elaborate methods, called **magic**, evolved that were designed to influence the spirits. People believed that appropriate words, objects, ceremonies, or human actions could influence the spirits. As rudimentary as these beliefs were, they at least gave early humans the feeling that they had some control over their fate.

Humans have always needed to understand, predict, and control nature. Animism, anthropomorphism, magic, religion, philosophy, and science can all be seen as efforts to satisfy those needs. Waterfield (2000) elaborates this point:

> All systems of belief evolve to elucidate the order of things and to make sense of the world. In this sense, science is just as much a myth as anything else; it is a framework or model designed to explain and form reality for those people who accept it—that is, for those people who voluntarily become members of that society—and for only as long as there are enough people to accept it. If this is so, then so far from banishing gods, science has merely been the matrix for a new generation of scientific gods, children of the old gods. (p. xxxii)

Homo Psychologicus

As Humphrey (1983) observed, early humans not only sought to understand, predict, and control nature, but also other people. Indeed, part of what makes us uniquely human is that we are all amateur psychologists of a sort. That is, the very survival of early humans was related to our ability to observe and understand what our conspecifics were feeling and intending to do. Even today, detecting and avoiding angry people, as well as quickly and intuitively understanding what a teammate expects us to do, or what another driver on the road is likely to do next, are common examples of how naturally we practice this psychology.

Because of this, Humphrey suggested that instead of being called *Homo sapiens*, we could more accurately be named *Homo psychologicus*. Modern developmental psychologists are interested in understanding how young children develop the skills that allow them to know what other persons are likely thinking and intending. This is called **theory of mind** (Baron-Cohen, Tager-Flusberg, & Cohen, 2000). At a more sociological level, we can also see then how early religions attributed human emotions and behaviors to its gods.

Early Greek Religion

In the fifth and sixth centuries B.C., the Greeks' explanations of things were still predominately religious in nature. There were two major theologies to choose from: the Olympian and the Dionysiac-Orphic. **Olympian religion** consisted of a belief in the Olympian gods as described in the Homeric poems. These gods tended to be irascible and amoral, and typically showed little concern with the anxieties of ordinary humans. Within Olympian religion, it was believed that the "breath-soul" did survive death but did so without any of the memories or personality traits of the person whose body it had occupied. Such a belief concerning life after death encouraged living one's life in the fullest, most enjoyable way. Typically, the ideal life was seen as involving the pursuit of glory through the performance of noble deeds: "In the thought of glory most Greeks found a consolation for the shadowy doom which awaited them in the grave" (Bowra, 1957, p. 51). The Olympian gods also personified orderliness and rationality, and valued intelligence. In short, the Olympian gods tended to have the same characteristics and beliefs as the members of the Greek upper class; it hardly seems surprising that the Greek nobility favored the Olympian religion.

The major alternative to Olympian religion was **Dionysiac-Orphic religion**. The wealthy Greek upper class was made possible, to a large extent, by a large underclass of peasants, laborers, and slaves whose lives were characterized by economic and political uncertainty. To these relatively poor, uneducated individuals, the Dionysiac-Orphic religion was most appealing. This religion was initially based on the legend of Dionysus, the god of wine and sexual frenzy, and his disciple Orpheus. Central to Dionysiac-Orphic religion was the belief in the **transmigration of the soul**. One version of this belief was that during its divine existence, at which time it dwelled among the gods, the soul had committed a sin; as punishment, the soul was locked into a physical body, which acted as its prison. Until the soul was redeemed, it continued a "circle of births," whereby it may find itself first inhabiting a plant, then an animal, then a human, then a plant again, and so on. What the soul longed for was its liberation from this transmigration and a return to its divine, pure, transcendent life among the gods.

Later in history, the Orphic idea that the soul seeks to escape its contaminated, earthly existence and enter into a more heavenly state following death gained enormous popularity and indeed became an integral part of our Judeo-Christian heritage.

THE FIRST PHILOSOPHERS

Magic, superstition, and mysticism, in one form or another, dominated attempts to understand nature for most of early history. It was therefore a monumental step in human thought when *natural* explanations were offered instead of supernatural ones. Given the historical evidence we have to work with, it appears that such explanations were first offered by the early Greeks. Indeed, the one reason that most academic histories (of biology, of physics, of psychology, etc.) start with the Greeks is that their ideas form the foundation for how we think about phenomena in the modern era.

Philosophy (literally, the love of knowledge or wisdom) began when natural explanations (*logos*) replaced supernatural ones (*mythos*). Waterfield (2000) uses Kuhnian terminology to describe the importance of this development: "The presocratic revolution was a genuine revolution—a paradigm shift of the first importance" (p. xxiii). The first philosophers were called cosmologists because they sought to explain the origin, the structure, and the processes governing the cosmos (universe). However, the Greek word *kosmos* did not only refer to the totality of things but also suggested an elegant, ordered universe. The aesthetic aspect of the meaning of the term *kosmos* is reflected in the English word *cosmetic*. Thus, to the early Greek cosmologists, the universe was ordered and pleasant to contemplate. The assumption of orderliness was extremely important because an orderly universe is, at least in principle, an explicable universe—an idea that would become central to Western civilization, and one that paves the way for the various modern sciences.

Thales

As noted in Chapter 1, seldom, if ever, is an idea fully developed by a single individual. **Thales (ca. 625–547 B.C.)**, often referred to as the first philosopher, had a rich intellectual heritage. He traveled to Egypt and Babylonia, both of which enjoyed advanced civilizations that no doubt influenced him. For example, the Egyptians had possessed for centuries the knowledge of geometry that Thales demonstrated. In Egypt and Babylonia, however, knowledge was either practical (geometry was used to lay out the fields for irrigated farming) or used primarily in a religious context (anatomy and physiology were used to prepare the dead for their journey into the next world). Thales was important because he emphasized natural explanations and minimized supernatural ones. That is, in his **cosmology**, Thales said that things in the universe consist of natural substances and are governed by natural principles; they do not reflect the whims of the gods. The universe is therefore knowable and within the realm of human understanding.

Thales searched for that one substance or element from which everything else is derived. The Greeks called such a primary element or substance a **physis**, and those who sought it were physicists. Physicists to this day are searching for the "stuff" from which everything is made. Thales concluded that the physis was water. Life depends on water, water exists in many forms (such as ice, steam, hail, snow, clouds, fog, and dew), and some water is found in every living thing. This conclusion that water is the primary substance had considerable merit.

> The most important of Thales' views is his statement that the world is made of water. This is neither so far fetched as at first glance it might appear, nor yet a pure figment of imagination cut off from observation. Hydrogen, the stuff that generates water, has been held in our time to be the chemical element from which all other elements can be synthesized. The view that all matter is one is quite a reputable scientific hypothesis. As for observation, the proximity of the sea makes it more than plausible that one should notice that the sun evaporates water, that mists rise from the surface to form clouds, which dissolve again in the form of rain. The earth in this view is a form of concentrated water. The details might thus be fanciful enough, but it is still a handsome feat to have discovered that a substance remains the same in different states of aggregation. (Russell, 1959, pp. 16–17)

Besides this achievement, Thales also predicted eclipses, developed methods of navigation based on the stars and planets, and applied geometric principles to the measurement of such things as the heights of buildings. He is even said to have cornered the market on olive oil by predicting weather patterns. Such practical accomplishments brought great fame to Thales and respectability to philosophy. Thales showed that a knowledge of nature, which minimized supernaturalism, could provide power over the environment, something humans had been seeking since the dawn of history.

Perhaps the most important thing about Thales, however, was the fact that he offered his ideas as speculations and welcomed criticism. With his invitation for others to criticize and improve on his teachings, Thales started the *critical tradition* that was to characterize early Greek philosophy: "I like to think that Thales was the first teacher who said to his students: 'This is how I see things—how I believe that things are. Try to improve upon my teaching'" (Popper, 1958, p. 29). We will have more to say about the importance of this critical tradition later in this chapter.

Anaximander and Heraclitus

Anaximander (ca. 610–547 B.C.), who studied with Thales, argued that even water was a compound of more basic material. (Notice that Anaximander took the advice of his teacher and criticized him.) According to Anaximander, the physis was something that had the capability of becoming anything. This "something" he called the boundless or the indefinite. Anaximander also proposed a rudimentary theory of evolution. From a mixture of water and earth, there arose fish. Because human infants cannot survive without a long period of protection, the first human infants grew inside these fish until puberty, at which time the carrier fish burst and humans that were developed enough to survive on their own emerged.

Impressed by the fact that everything in nature seemed to be in a constant state of flux, or change, **Heraclitus (ca. 540–480 B.C.)** assumed fire to be the physis because in the presence of fire everything is transformed into something else. To Heraclitus, the overwhelming fact about the world was that nothing ever "is"; rather, everything is "**becoming**." Nothing is either hot or cold but is becoming hotter or colder; nothing is fast or slow but is becoming faster or slower. Heraclitus's position is summarized in his famous statement: "It is impossible to step twice into the same river" (Waterfield, 2000, p. 41). Heraclitus meant that the river becomes something other than what it was when it was first stepped into.

Heraclitus believed that all things existed somewhere between polar opposites—for example, night-day, life-death, winter-summer, up-down, heat-cold, sleeping-waking. For him, one end of the pole defined the other, and the two poles were inseparable. Only through injustice can justice be known, and only through illness can health be known.

Heraclitus raised an epistemological question that persists to this day: How can something be known if it is constantly changing? If something is different at two points in time and therefore not really the same object, how can it be known with certainty? Does not knowledge require permanence? It was at this point in history that the senses became a questionable means of acquiring knowledge because they could provide information only about a constantly changing world. In answer to the question, What can be known with certainty? empirical events could not be included because they were in a constant state of flux. Those seeking something unchangeable, and thus knowable, had two choices. They could choose something that was real but undetectable by the senses, as the atomists and the Pythagorean mathematicians did (discussed later), or they could choose something mental (ideas or the soul), as the Platonists and the Christians did. Both groups believed that anything experienced through the senses was too unreliable to be known. Even today, the goal of science is to discover general laws that are abstractions *derived* from sensory experience. Scientific laws as abstractions are thought to be flawless; when manifested in the empirical world, however, they are only probabilistic.

Heraclitus's philosophy clearly described the major problem inherent in various brands of empiricism. That is, the physical world is in a constant state of flux, and even if our sense receptors could accurately detect physical objects and events, we would be aware only of objects and events that change from moment to moment. It is for this reason that empiricists are said to be concerned with the process of becoming rather than with being. **Being** implies permanence and thus at least the possibility of certain knowledge, whereas a knowledge of empirical events (because they are becoming) can be only probabilistic at best. Throughout psychology's history, those claiming that there are certain permanent and therefore knowable things about the universe or about humans have tended to be rationalists. Those saying that everything in the universe, including humans, is constantly changing and thus incapable of being known with certainty tend to be empiricists.

Parmenides and Zeno

Taking a view exactly the opposite of Heraclitus's, **Parmenides (born ca. 515 B.C.)** believed that all change was an illusion. There is only one reality; it is finite, uniform, motionless, and fixed and can be understood only through reason. Thus, for Parmenides, knowledge is attained only through rational thought because sensory experience provides only illusion. Parmenides supported his position with logic. Like the earliest humans, he believed that being able to speak or think of something implied its existence (reification) because we cannot think of something that does not exist. The following is a summary of this argument:

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Zeno of Elea (ca. 495–430 B.C.), a disciple of Parmenides, used logical demonstrations to show that motion was an illusion. Imagine an archer firing at a target. He said that for an arrow to go from the bow (point A) to the target (point B), it must first go half the distance between A and B. Then it must go half the remaining distance, then half of that distance, and so on, never reaching the target since some halfable distance always remains. Therefore, it is logically impossible for the arrow ever to reach the target. The fact that it seems to do so is a weakness of the senses. This reasoning, usually known as **Zeno's paradox**, can be expressed in many different parables.

Parmenides and Zeno concluded that either logic, mathematics, and reason were correct or the information provided by the senses was, and they opted for logic, mathematics, and reason.

Pythagoras

By showing that mathematics can be used to model—and thus explain and predict nature, **Pythagoras (ca. 580–500 B.C.)** has had as significant an influence on Western thought as perhaps anyone. Pythagoras postulated that the basic explanation (the *logos*; as in logical structure) for everything in the universe was found in numbers and in numerical relationships (*ratios*; as in rationality). He noted that the square of the hypotenuse of a right-angle triangle is exactly equal to the sum of the squares of its other two sides. Although this came to be called the Pythagorean theorem, it had probably been known to the Babylonians previously. Pythagoras also observed that a harmonious blending of tone results when one string on a lyre is exactly twice as long as another. This observation that strings of a lyre must bear certain relationships with one another to produce pleasant, harmonious sounds was, perhaps, psychology's first psychophysical law. Indeed, physical events (relationships between strings on musical instruments) were demonstrated to be systematically related to psychological events (perceived pleasantness of sounds). And, the Pythagoreans expressed this psychophysical relationship in mathematical terms.

Just as pleasant music results from the harmonious blending of certain tones, so too does health depend on the harmonious blending of bodily elements. The Pythagoreans thought illness resulted from a disruption of the body's equilibrium, and medical treatment consisted of attempts to restore that equilibrium. (We will see later that the Pythagorean approach was also to be extremely influential to medicine.) Pythagoras took these and several other observations and created a school of thought that glorified mathematics. He and his followers applied mathematical principles to almost every aspect of human existence, creating "a great muddle of religious mysticism, music, mathematics, medicine, and cosmology" (Esper, 1964, p. 52).

According to the Pythagoreans, numbers and numerical relationships, although abstract, were nonetheless real and exerted an influence on the empirical world. The world of numbers existed independently of the empirical world and could be known in its pure form only through reason. When conceptualized, the Pythagorean theorem is exactly correct and applies to all right-angle triangles that ever were or ever will be. As long as the theorem is applied rationally to imagined triangles, it is flawless; when applied to actual triangles, however, the results are not absolutely correct because there are no perfect triangles in the empirical world. In fact, according to the Pythagoreans, *nothing* is perfect in the empirical world. Perfection is found only in the abstract mathematical world that lies beyond the senses and therefore can be embraced only by reason.

The Pythagoreans assumed a dualistic universe: one part abstract, permanent, and intellectually knowable (like that proposed by Parmenides) and the other empirical, changing, and known through the senses (like that proposed by Heraclitus). Sensory experience, then, cannot provide knowledge. In fact, such experience interferes with the attainment of knowledge and should be avoided. This viewpoint grew into outright contempt for sensory experiences and for bodily pleasures, and the Pythagoreans launched a crusade against vice, lawlessness, and bodily excess of any type. Members of this school imposed on themselves long periods of silence to enhance clear, rational thought. Moreover, they attempted to cleanse their minds by imposing certain taboos and by hard physical and mental exercise. The taboos included eating flesh and eating beans. Among other things, beans cause excessive flatulence, a condition contrary to the tranquility of mind necessary for seeking the truth. In a sense, the Pythagoreans introduced an early version of the belief "You are what you eat"; they believed that "each kind of food that is introduced into the human body becomes the cause of a certain peculiar disposition" (Guthrie, 1987, p. 107).

The Pythagoreans believed that the universe was characterized by a mathematical harmony and that everything in nature was interrelated. Following this viewpoint, they encouraged women to join their organization (it was *very* unusual for Greeks to look upon women as equal to men in any area), argued for the humane treatment of slaves, and, as mentioned, developed medical practices based on the assumption that health resulted from the harmonious workings of the body and illness resulted from some type of imbalance or discord.

The belief that experiences of the flesh are inferior to those of the mind—a belief that plays such an important role in Plato's theory and is even more important in early Christian theology—can be traced directly to the Pythagoreans. In turn, Plato based his Academy on Pythagorean concepts, and a sign above the entrance read, "Let no one without an understanding of mathematics enter here."

Pythagoras postulated two worlds, one physical and one abstract, the two interacting with each other. Of the two, the abstract was considered the better. Pythagoras also postulated a dualism in humans, claiming that, in addition to the flesh of the body, we have reasoning powers that allow us to attain an understanding of the abstract world. Furthermore, reasoning is a function of the soul, which the Pythagoreans believed to be immortal. Pythagoras' philosophy provides one of the first clear-cut mind-body dualisms in the history of Western thought.

We see many elements in common between Dionysiac-Orphic religion and Pythagorean philosophy. Both viewed the body as a prison from which the soul should escape; or, at the very least, the soul should minimize the lusts of the vile body that houses it by engaging in the rational contemplation of unchanging truths. Both accepted the notion of the transmigration of souls, and both believed that only purification could stop the "circle of births." The notion of transmigration fostered in the Pythagoreans a spirit of kinship with all living things. It is for this reason that they accepted women into their organizations, argued for the humane treatment of slaves, and were opposed to the maltreatment of animals. It is said of Pythagoras that "when he passed a puppy that was being whipped … he took pity on it and made this remark: 'Stop, do not beat it; for it is the soul of a dear friend'" (Barnes, 2001, p. 29). It was for the same reason that the Pythagoreans were vegetarians. The origin of other Pythagorean taboos is more difficult to determine—for example, "Do not urinate towards the sun" (Guthrie, 1987, p. 146).

We will see later in this chapter that Plato borrowed much from the Pythagoreans. It was through Platonic philosophy that elements of the Dionysiac-Orphic religion became part of the heritage of Western civilization.

Empedocles

Empedocles (ca. 490–430 B.C.) was a physician and a disciple of Pythagoras. He claimed his soul had been migrating for quite a while: "For already have I become a boy and a girl and a bush and a bird and a silent fish in the sea" (Barnes, 2001, p. 157). Instead of one physis, Empedocles suggested four elements from which everything in the world is made: earth, fire, air, and water. Humans, too, he thought, consist of these four elements, with earth forming the solid part of the body, water accounting for the liquids in the body, air providing the breath of life, and fire providing our reasoning ability.

Besides the four elements, Empedocles postulated two causal powers of the universe: love and strife. Love is a force that attracts and mixes the elements, and strife is a force that separates the elements. Operating together, these two forces create an unending cosmic cycle consisting of four recurring phases. In phase one, love dominates and there is a perfect mixture of the four elements ("one from many"). In phase two, strife disrupts the perfect mixture by progressively separating them. In phase three, strife has managed to completely separate the elements ("many from one"). In phase four, love again becomes increasingly dominant, and the elements are gradually recombined. As this cycle recurs, new worlds come into existence and then are destroyed. A world consisting of things we would recognize could exist only during the second and fourth phases of the cycle, when a mixture of the elements can exist. Along with the four elements, humans also possess the forces of love and strife, and these forces wax and wane within us just as they do in other material bodies. When love dominates, we have an urge to establish a union with the world and with other people; when strife dominates, we seek separation. Clearly, the ingredients are here for the types of intrapersonal and extrapersonal conflicts described by Freud and others much later in human history.

For Empedocles, the four elements and the forces of love and strife have always existed. In fact, all that can ever be must be a mixture of the elements and the two forces. Nothing beyond these mixtures is possible. He said, "From what does not exist nothing can come into being, and for what exists to be destroyed is impossible and unaccomplishable" (Barnes, 2001, p. 131). This is similar to the modern law of conservation of energy, which states that energy can take different forms but cannot be created or destroyed.

Empedocles also offered a theory of evolution that was more complex than the one previously suggested by Anaximander. In the phase when there is a mixture of love and strife, all types of things are created, some of them very bizarre. Animals did not form all at once but part by part, and the same was true of humans: "Many neckless heads sprang up.... Naked arms wandered, devoid of shoulders, and eyes strayed alone, begging for foreheads" (Barnes, 2001, p. 142). As these various body parts roamed around, they were combined in a random fashion: "Many grew double-headed, double-chested—man-faced oxen arose, and again ox-headed men—creatures mixed partly from male partly from female nature" (Barnes, 2001, p. 143). Elsewhere, Empedocles described what happens when the four elements are acted on by love and strife: "As they mingled, innumerable types of mortal things poured forth, fitted with every sort of shape, a wonder to see" (Barnes, 2001, p. 128). Most random pairings resulted in creatures incapable of surviving, and they eventually perished. Some chance unions produced viable creatures, however, and they survived—humans among them. What we have here is an early version of natural selection by the survival of the fittest.

Empedocles was also perhaps the first philosopher to offer a theory of perception. He assumed that each of the four elements was found in the blood. Objects in the outside environment throw off tiny copies of themselves called emanations, or **eidola** (singular *eidolon*), which enter the blood through the pores of the body. Because like attracts like, the eidola will combine with elements that are like them. The fusion of external elements with internal elements results in perception. Empedocles believed that the matching of eidola with their corresponding internal elements occurred in the heart. In sum, his view was that we perceive objects by internalizing copies of them.

To the Pythagorean notion that health reflected a bodily equilibrium, Empedocles added the four elements. Health occurs when the four elements of the body are in proper balance; illness results when they are not. And as we will see, the medical theories of Pythagoras and Empedocles were to be highly influential on later thinkers.

Anaxagoras

Anaxagoras (ca. 500–428 B.C.), a close friend and mentor of Pericles, taught that all things in

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the world as we know it were originally mixed together. Furthermore, everything in our world, including humans, continues to be aggregates of that primordial mixture. Like Empedocles, Anaxagoras believed nothing can come from nothing. However, whereas Empedocles postulated four elements from which everything is derived, Anaxagoras postulated an infinite number of elements that he referred to as "seeds." As examples of these elements or seeds Anaxagoras listed water, fire, hair, bread, meat, air, wet, dry, hot, cold, thin, thick, wood, metal, and stone. However, these elements or seeds do not exist in isolation. Every element contains all the other elements. How then do objects become differentiated? Waterfield (2000) explains: "Everything is present in every seed and in every item of the universe, but in different proportions" (p. 118). It is the difference in the proportion of the seeds present that give objects their characteristics:

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There was a single exception to Anaxagoras's claim that everything contains everything. Mind, he said, is pure in the sense that it contains no other elements. Also, mind is not necessarily present in other elements. Where it is present, life exists. For example, mind is present in humans and other living things but not in such things as stones or rivers.

Democritus

Democritus (ca. 460–370 B.C.) is considered the last of the early Greek cosmologists. Democritus said that all things are made of tiny, indivisible parts called atoms (from the Greek *atomos*, meaning "indivisible"). The differences among things are explained by the shape, size, number, location, and arrangement of atoms. Atoms themselves were believed to be unalterable, but they could have different arrangements; so although the actual atoms do not change, the objects that are made of them can change. Humans, too, are bundles of atoms, and the soul or mind is made up of smooth, highly mobile fire atoms that provide our mental experiences. For Democritus, therefore, animate, inanimate, and cognitive events were reduced to atoms and atomic activity. Because the behavior of atoms was thought to be lawful, Democritus's view was deterministic. It also exemplified physical monism (materialism) because everything was explained in terms of the arrangement of atoms and there was no separate life force; that is, he denied vitalism. Democritus's view also incorporated **elementism** because no matter how complex something was, Democritus believed it could be explained in terms of atoms and their activity. Finally, Democritus's philosophy exemplified **reductionism** because he attempted to explain objects and events on one level (observable phenomena) in terms of events on another level (atoms and their activity). Reductionism is contrasted with elementism in that the former involves two different domains of explanation, whereas the latter attempts to understand a complex phenomenon by separating it into its simpler component parts. Attempting to explain human behavior in terms of biochemical processes would exemplify reductionism, as would attempting to explain biochemical processes in terms of physics. Attempting to understand human thought processes by isolating and studying one process at a time or attempting to understand complex human behavior by isolating specific habits or stimulus-response associations would exemplify elementism. Democritus was both a reductionist and an elementist.

The explanations of sensation and perception offered by Empedocles and Democritus both emphasized the importance of eidola (emanations). However, for Democritus, sensations and perceptions arise when atoms (not tiny replicas) emanate from the surfaces of objects and enter the body through one of the five sensory systems (not bodily pores) and are transmitted to the brain (not the heart).

Upon entering the brain, the emanations sent by an object cause the highly mobile fire atoms to form a copy of them. This match between eidola and atoms in the brain causes perception. Democritus stressed that eidola are not the object itself and that the match between the eidola and the atoms in the brain may not be exact. Therefore, there may be differences between the physical object and the perception of it. As noted in Chapter 1, one of the most persistent problems in psychology has been determining what is gained or lost as objects in the environment are experienced through the senses. Democritus was well aware of this problem.

Democritus placed thinking in the brain, emotion in the heart, and appetite in the liver. He discussed five senses—vision, hearing, smell, touch, and taste—and suggested four primary colors—black, red, white, and green—from which all colors were derived. Because he believed that all bodily atoms scattered at death, he also believed that there was no life after death. His was the first completely naturalistic view of the universe, devoid of any supernatural considerations. Although his view contained no gods or spirits to guide human action, Democritus did not condone a life of hedonism (pleasure seeking). He preached moderation, as did his disciple Epicurus 100 years later.

EARLY GREEK MEDICINE

In *The Odyssey*, Homer described medical practitioners as roaming around selling their services to anyone needing them. The successful practitioners gained a reputation that preceded them; a few became viewed as godlike, and after their deaths, temples were erected in their honor. Other temples were named in honor of Asclepius, the Greek god of medicine. Asclepius was believed to be the son of Apollo and the father of Hygeia, the goddess of health. An ancient statue of Asclepius shows him with a snake wrapped around a rod. The snake symbolized mystery, power, and knowledge and was employed in several healing rituals. The rod and snake (sometimes called a caduceus) continues to symbolize the medical profession.

At the temples, priests practiced medicine in accordance with the teachings of the famous deceased practitioners. The priests kept such teachings largely secret and this **temple medicine** became very popular. In fact, insofar as the ailments treated were psychosomatic (or trivial and transitory), temple medicine was likely effective because treatment was typically accompanied by an abundance of ritual and lengthy ceremony. For example, patients would need to wait before being seen by a priest, drink "sacred" water, wear special robes, and sleep in a sanctuary. During the period of sleep—a high point in treatment—the patient (it was claimed) often had a dream in which a priest or god would directly cure the patient or tell him or her what to do in order to be cured.

Alcmaeon

Among the first to move away from temple medicine and toward more rational, naturalistic medicine was **Alcmaeon (fl. ca. 500 B.C.)**. Alcmaeon (perhaps a Pythagorean) equated health with a balance of such qualities as warm and cold, moist and dry, and bitter and sweet. If one or more qualities dominates a person's system, sickness results. According to Alcmaeon, the physician's job is to help the patient regain a lost equilibrium, thereby regaining health. For example, a fever represented excess heat, and the treatment involved cooling the patient; excessive dryness of skin was treated with moisturizing herbs; and so forth. Diagnosis involved discovering the source of the disturbance of equilibrium, and treatment involved a procedure that would restore equilibrium. This Pythagorean view of health as a balance, or a harmony, was to have a profound influence on medicine and has persisted to the present time.

In addition to promoting naturalistic medicine, Alcmaeon was important for other reasons. He was among the first known to dissect human bodies for inquiry (as opposed to funerary practice). For example, he dissected the eye and traced the optic nerve to the brain. Unlike later thinkers such as Empedocles and Aristotle, who placed mental functions in the heart, Alcmaeon concluded that sensation, perception, memory, thinking, and understanding occurred in the brain. Alcmaeon's feats were truly remarkable, considering when they occurred. He did much to rid medicine of superstition and magic, and he used physiological information to reach conclusions concerning psychological functioning. As a physician interested in psychological issues, Alcmaeon begins an illustrious tradition later followed by such individuals as Helmholtz, Wundt, James, and Freud.

Hippocrates

Hippocrates (ca. 460–377 B.C.) was born on the Greek island of Cos into a family of priests and physicians. He was educated at a famous school in Cos and received medical training from his father and other medical practitioners. By the time Hippocrates moved to Athens, he had acquired remarkable proficiency in the diagnosis, prognosis, and treatment of disease. He kept detailed records that gave precise accounts of mumps, epilepsy, hysteria, arthritis, and tuberculosis, to name only a few. From his training and observations, Hippocrates concluded that all disorders (both mental and physical) were caused by natural factors such as inherited susceptibility to disease, organic injury, and an imbalance of bodily fluids. Hippocrates is often referred to as the father of medicine, but this is only correct if we view him as "a culmination rather than a beginning" (Brett, 1912–1921/1965, p. 54). Several important physicians before Hippocrates (such as Alcmaeon and Empedocles) had challenged medical practices based on superstition and magic. However, Hippocrates' great accomplishment was that he took the development of naturalistic medicine to new heights.

As with Pythagoras, it is difficult to separate what Hippocrates actually said from what his followers said. However, there is a corpus of ancient material consistent enough to be referred to as Hippocratic writings (see, for example, Lloyd, 1978). Therefore, we will hereafter refer to the Hippocratics rather than to Hippocrates.

The Hippocratics forcefully attacked the vestiges of supernatural medicine that still existed in their day. For example, epilepsy was called the sacred disease, suggesting possession by an evil spirit. The Hippocratics disagreed, saying that all illnesses had natural and not supernatural causes. Supernatural causes, they said, were postulated in order to mask ignorance.

> I do not believe that the "Sacred Disease" is any more divine or sacred than any other disease but, on the contrary, has specific characteristics and a definite cause. Nevertheless, because it is completely different from other diseases, it has been regarded as a divine visitation by those who, being only human, view it with ignorance and astonishment. It is my opinion that those who first called this disease "sacred" were the sort of people we now call witchdoctors, faith-healers, quacks and charlatans. These are exactly the people who pretend to be very pious and to be particularly wise. By invoking a divine element they were able to screen their own failure to give suitable treatment and so called this a "sacred" malady to conceal their ignorance of its nature. (Lloyd, 1978, pp. 237–238)

The Hippocratics agreed with Empedocles that everything is made from four elements—earth, air, fire, and water—and that humans, too, are made up of these elements. However, the Hippocratics also associated the four elements with four humors in the body. They associated earth with black bile, air with yellow bile, fire with blood, and water with phlegm. Individuals for whom the humors are properly balanced are healthy; an imbalance among the humors results in illness.

The Hippocratics strongly believed that the body has the ability to heal itself and that it is the physician's job to facilitate this natural healing. Thus, the "cures" the Hippocratics recommended included rest, proper diet, exercise, fresh air, massage, and baths. According to the Hippocratics, the *worst* thing a physician could do would be to interfere with the body's natural healing power. They also emphasized treating the total, unique patient and not a disease. The Hippocratic approach to treatment emphasized an understanding physician and a trusting, hopeful patient. The Hippocratics also advised physicians not to charge a fee if a patient was in financial difficulty.

> Sometimes give your services for nothing, calling to mind a previous benefaction or present satisfaction. And if there be an opportunity of serving one who is a stranger in financial straits, give full

> assistance to all such. For where there is love of man, there is also love of the art. For some patients, though conscious that their condition is perilous, recover their health simply through their contentment with the goodness of the physician. (W. H. S. Jones, 1923, Vol. 1, p. 319)

Other maxims concerning the practice of medicine are contained in the famous Hippocratic oath which reads, in part, as follows:

> I will use my power to help the sick to the best of my ability and judgment; I will abstain from harming or wronging any man by it.
>
> I will not give a fatal draught to anyone if I am asked, nor will I suggest any such thing. Neither will I give a woman means to procure an abortion.
>
> I will be chaste and religious in my life and in my practice….
>
> Whenever I go into a house, I will go to help the sick and never with the intention of doing harm or injury. I will not abuse my position to indulge in sexual contacts with the bodies of women or of men, whether they be freemen or slaves.
>
> Whatever I see or hear, professionally or privately, which ought not to be divulged, I will keep secret and tell no one. (Lloyd, 1978, p. 67)

But is the Hippocratic oath really Hippocratic? After careful examination of the oath, Ludwig Edelstein (see Temkin & Temkin, 1987) argued that it was written in the fourth century B.C. and reflects the strong influence of Pythagorean philosophy. For example, he noted that of the prevailing philosophies at the time, only the Pythagoreans had prohibitions against abortion and physician-assisted suicide, believing both to be an affront to the gods. For this and other reasons, Edelstein's conclusion was unequivocal:

> I can say without hesitation that the so-called Oath of Hippocrates is a document uniformly conceived and thoroughly saturated with Pythagorean philosophy. In spirit and letter, in form and content, it is a Pythagorean manifesto. The main features of the Oath are only understandable in connection with Pythagoreanism; all its details are in complete agreement with this system of thought. (Temkin & Temkin, p. 53)

However, questioning the origin of the "Hippocratic oath" does nothing to diminish the importance of the Hippocratics to the history of medicine. Most agree with V. Robinson that the work of the Hippocratics "marks the greatest revolution in the history of medicine" (1943, p. 51). We will have more to say about the Hippocratics when we review the early treatment of the mentally ill in Chapter 15.

About 500 years after Hippocrates, **Galen (ca. A.D. 130–200)** associated the four humors of the body with four temperaments (the term *temperament* is derived from the Latin verb *temperare* meaning "to mix"). If one of the humors dominates, the person displays the characteristics associated with that humor (see Table 2.1). Galen's extension of Hippocrates' views created a rudimentary theory of personality, as well as a way of diagnosing illness that was to dominate medicine for the next 15 centuries. In fact, within the realm of personality theory, Galen's ideas continue to be influential (see, for example, Eysenck & Eysenck, 1985; Kagan, 1994), and can be seen as analogous to the modern use of drugs to alter the levels of various neurotransmitters as a way of treating mood disorders.

TABLE 2.1 Galen's Extension of Hippocrates' Theory of Humors

Humor	Temperament	Characteristic
Phlegm	Phlegmatic	Sluggish, unemotional
Blood	Sanguine	Cheerful
Yellow bile	Choleric	Quick-tempered, fiery
Black bile	Melancholic	Sad

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THE RELATIVITY OF TRUTH

The step from supernatural explanations of things to natural ones was enormous, but various philosophers found the basic element (physis) to be water, fire, numbers, the atom, the boundless, and some even found more than one basic element. Some said that things are constantly changing, others that nothing changes, and still others that some things change and some do not. Furthermore, most of these philosophers and their disciples were outstanding orators who presented and defended their views with convincing logic. Where does this leave the individual seeking the truth? Such an individual is much like the modern college student who goes to one class and is convinced of something (such as that psychology is a science), only to go to another class to be convinced of the opposite (psychology is not a science). Which is true?

In response to the confusion, one group of philosophers concluded that there is not just one truth but many. In fact, they believed that anything is true if you can convince someone that it is true. Nothing, they said, is inherently right or wrong, but believing makes it so. These philosophers were called Sophists. The **Sophists** were professional teachers of rhetoric and logic who believed that truth was relative, and therefore no single "Truth" was thought to exist. This belief marked a major shift in philosophy. The question was no longer, What is the universe made of? but, What can humans know and how can they know it? In other words, there was a shift toward epistemological questions.

Protagoras

Protagoras (ca. 485–410 B.C.), perhaps the best-known Sophist, summarized the position with his famous statement: "Man is the measure of all things—of the things that are, that they are, and of things that are not, that they are not" (Waterfield, 2000, p. 211). This statement is pregnant with meaning. First, truth depends on the perceiver rather than on physical reality. Second, because perceptions vary with the previous experiences of the perceiver, they will vary from person to person. Third, what is considered to be true will be, in part, culturally determined because one's culture influences one's experiences. Fourth, to understand why a person believes as he or she does, one must understand the person. According to Protagoras, therefore, each of the preceding philosophers was presenting his subjective viewpoint rather than the objective "Truth" about physical reality. Paraphrasing Heraclitus's famous statement, Protagoras said, "Man never steps into the same river *once*," because the river is different for each individual *to begin with*. Protagoras emphasized the importance of rhetorical skills in getting one's point of view considered and, perhaps, to prevail. For a fee, which was typical of the Sophists, he taught his students to take both sides of an argument and created debating competitions where he introduced the disputants to the tricks of the trade. Critics accused Protagoras of teaching how to "make the weaker argument stronger" or "to make the worse or morally more unsound argument defeat the more sound one" (Waterfield, 2000, pp. 205–206). However, Protagoras was primarily interested in teaching the skills necessary for effective communication, and under the Periclean democracy in which he lived, the value of such skills was considerable.

> In the direct democracy that prevailed in Athens at the time, speeches could make or break a political career, and the constitution almost guaranteed that every prominent figure was likely to find himself in court at some time or other, where again a good speech could save his life, or at least prevent the loss of property and prestige. (Waterfield, 2000, p. 207)

Although Protagoras taught that nothing is false, he believed that some beliefs are more valuable than others. For example, in the political sphere, some beliefs are more conducive to utilitarian harmony than others and, he believed, effective argumentation would demonstrate this.

Concerning the existence of the Greek gods, Protagoras was an agnostic. He said, "Where the gods are concerned, I am not in a position to ascertain that they exist, or that they do not exist. There are many impediments to such knowledge, including the obscurity of the matter and the shortness of human life" (Waterfield, 2000, p. 211).

With Protagoras, the focus of philosophical inquiry shifted from the physical world to human concerns. We now had a theory of *becoming* that was different from the one offered by Heraclitus. *Man* is the measure of all things, and therefore there is no universal truth or code of ethics or anything else. In Chapter 20, we will see that the extreme relativism of the Sophists has much in common with the contemporary movement called postmodernism.

Gorgias

Gorgias (ca. 485–380 B.C.) was a Sophist whose position was even more extreme than Protagoras's. Protagoras concluded that, because each person's experience furnishes him or her with what seems to be true, "all things are equally true." Gorgias, however, regarded the fact that knowledge is subjective and relative as proof that "all things are equally false." Furthermore, because the individual can know only his or her private perceptions, there can be no objective basis for determining truth. Gorgias's position, as well as Protagoras's, exemplified **nihilism** because it stated that there can be no objective way of determining knowledge or truth. The Sophist position also exemplifies **solipsism** because the self can be aware of nothing except its own experiences and mental states. Thus, Gorgias reached his three celebrated conclusions: Nothing exists; if it did exist, it could not be comprehended; and if it could be comprehended, it could not be communicated to another person.

Specifically, Gorgias argues that if there is a physical world, we can experience it only through sense impressions, and the relationship between the physical world and sense impressions cannot be known. Second, we do not think in terms of sense impressions but in terms of the words used to describe those impressions. Therefore, there is an unbridgeable gap between the sensory events caused by the physical world and the words used to describe those events. And third, because the meaning of the words that are used to express thoughts are unique to each individual, there is an another unbridgeable gap between one person's thoughts and those of another. Therefore, accurate communication among individuals is impossible.

Gorgias, like the other Sophists, emphasized the power of the spoken word. He likened the effect of words on the mind to the effect of drugs on the body. However, he believed that words were essentially deceitful. That is, words do not describe things as they are in the physical world but only our beliefs about such things. Beliefs consist of words and therefore can be manipulated by words—thus the importance of rhetorical techniques.

The Sophists clearly and convincingly described the gulf that exists between the physical world and the perceiving person. They also called attention to the difficulties in determining the relationships among terms, concepts, and physical things. In fact, as we have seen, the Sophists were well aware of the difficulty in demonstrating the external (physical) existence of anything. We saw in Chapter 1 that humans have always had a strong tendency toward reification—that is, to believe that because something has a name it exists. Concerning this belief, Gorgias said,

> If things considered [thought about] are existent, all things considered exist, and in whatever way anyone considers them, which is absurd. For if one considers a flying man or chariot racing in the sea, a man does not straightway [*sic*] fly nor a chariot race in the sea. (Kennedy, 1972, p. 45)

The Sophists also raised the thorny question of what one human consciousness can know about another human consciousness. Or, as Wittgenstein (Chapter 20; and some 2,000 years later) would ask, if I tell you that I have a pain, can you really know what I am experiencing—what it feels like to me, even if I try to describe it in great detail?

Xenophanes

Even before the Sophists, **Xenophanes (ca. 560–478 B.C.)** had attacked religion as a human invention. He noted that the Olympian gods acted suspiciously like humans. They lie, steal, philander, and even murder: "Homer … attributed to the gods all the things which among men are shameful and blameworthy—theft and adultery and mutual deception" (Barnes, 2001, p. 42). Xenophanes also noted that dark-skinned people had dark-skinned gods and light-skinned people had light-skinned gods. He went so far as to say that if animals could describe their gods, they would have the characteristics of the animals describing them:

> Mortals think that the gods are born, and have clothes and speech and shape like their own. But if cows and horses or lions had hands and drew with their hands and made the things men make, then horses would draw the forms of gods like horses, cows like cows, and each would make their bodies similar in shape to their own. (Barnes, 2001, p. 43)

With regard to religion, Xenophanes observed that not only do humans create whatever "truth" exists, but they also create whatever religion exists. Moral codes, then, are not divinely inspired; they are human inventions. However, it would be incorrect to conclude that Xenophanes was an atheist. What made him most controversial was that he postulated a supreme god with characteristics unlike those of any of the Olympian gods that were popular at the time. Waterfield (2000, pp. 26–27) summarizes those characteristics:

> One god, greatest among gods and men.
> In no way similar to mortal men in body or in thought.
> Complete he sees, complete he thinks, complete he hears.
> He remains forever in the same place, entirely motionless,
> Nor is it proper for him to move from one place to another.
> But effortlessly he shakes all things by thinking with his own mind.

Interestingly, Xenophanes was skeptical even of his own teachings, remarking:

> Let these things be believed as approximations to the truth. (Waterfield, 2000, p. 30)

The relativist nature of truth on which the Sophists insisted was distasteful to many who wanted truth to be more than the projection of one's subjective reality onto the world. As we will see, this debate became a constant theme in the history of philosophy and continues to be.

Socrates was the first to provide a serious challenge to the relativism of the Sophists, with whom he both agreed and disagreed.

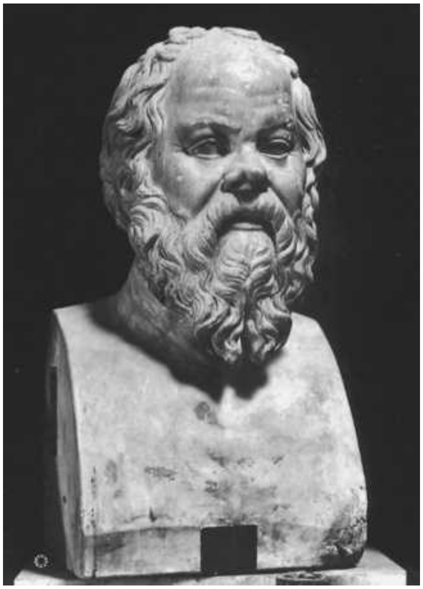
Socrates

Socrates (ca. 470–399 B.C.) agreed with the Sophists that individual experience is important. He took the injunction "Know thyself," inscribed on the portals of the temple of Apollo at Delphi, to indicate the importance of knowing the contents of one's own mind or soul (Allen, 1991). He went so far as to say, "The life which is unexamined is not worth living" (Jowett, 1988, p. 49). However, he disagreed with the Sophists' contention that no truth exists beyond personal opinion. In his search for truth, Socrates used a method sometimes called **inductive definition**, which started with an examination of instances of such concepts as beauty, love, justice, or truth and then moved on to such questions as, What is it that *all* instances of beauty have in common? In other words, Socrates asked what it is that makes something beautiful, just, or true. In this way, he sought to discover general concepts by examining specific examples. It was thought that these concepts transcend their individual manifestations and are therefore stable and knowable. What Socrates sought was the **essence** of such things as beauty, justice, and truth. The essence of something is its basic nature, its identifying, enduring characteristics. To truly know something, according to Socrates, is to understand its essence. It is not enough to identify something as beautiful; one must know *why* it is beautiful. One must know what *all* instances of beauty have in common; one must know the essence of beauty.

It is important to note that although Socrates sought the essence of various concepts, he did not believe that essences had abstract existence. For him, an essence was a universally acceptable definition of a concept—a definition that was both accurate and acceptable to all interested parties. Once such definitions were formulated, accurate communication among concerned individuals was possible. Contrary to the Sophists, who believed truth to be personal and noncommunicable, Socrates believed truth could be general and shared. Still, the essences that Socrates sought were verbal definitions, nothing more.

For Socrates, the understanding of essences constituted knowledge, and the goal of life was to gain knowledge. When one's conduct is guided by knowledge, it is necessarily moral. For example, if one knows what justice is, one acts justly. For Socrates, knowledge and morality were intimately related; knowledge is virtue, and improper conduct results from ignorance. Unlike most of the earlier philosophers, Socrates was concerned mainly with what it means to be human and the problems related to human existence.

In 399 B.C., when Socrates was 70 years old, he was accused of disrespect for the city gods and of corrupting the youth of Athens. Socrates was charged with corrupting the youth of Athens because he caused them to question all things, including many cherished traditional beliefs. Perhaps on the latter charge he was guilty. In any case, Socrates was found guilty on both charges and sentenced to death. However, the end of his trial coincided with a religious observance during which executions were unlawful. During the month-long delay, Socrates was imprisoned but met regularly with his friends. Apparently, it would have been easy for Socrates to escape from Athens at this time, and he was encouraged by his friends to do so. It is even suggested that Socrates' escape would have been condoned by the authorities, "to whom the execution of such a prominent figure may well have been an embarrassment" (Taylor, 1998, p. 11). Socrates preferred death over exile from his beloved Athens and, in the end, he consumed a drink containing deadly hemlock, thus fulfilling the order of the court.



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Socrates

In the *Apology* (Jowett, 1988), Plato has Socrates, while awaiting his self-administered execution, recall a story explaining how he (Socrates) came to be considered the wisest of men. According to the story, a friend of Socrates went to the oracle of Delphi and asked if there was any man wiser than Socrates, and the oracle said no. Socrates was amazed to hear this because he considered himself ignorant. He set out to find men wiser than himself, so that he could refute the oracle. In his quest, Socrates questioned anyone who had the reputation of being wise. After many such encounters, Socrates concluded that these individuals really knew nothing, although they thought they did. Socrates, on the other hand, neither knew anything nor thought he did. Perhaps, Socrates reflected, it was for this reason that the oracle proclaimed him to be the wisest of men.

In his search for a person wiser than himself, Socrates questioned many of the leading citizens of Athens—including a number of politicians—and Socrates' method of inquiry was abrasive. As was the case with the youth of Athens, these encounters challenged many cherished beliefs such as those concerning justice, courage, and even democracy. So, in addition to perhaps being viewed as

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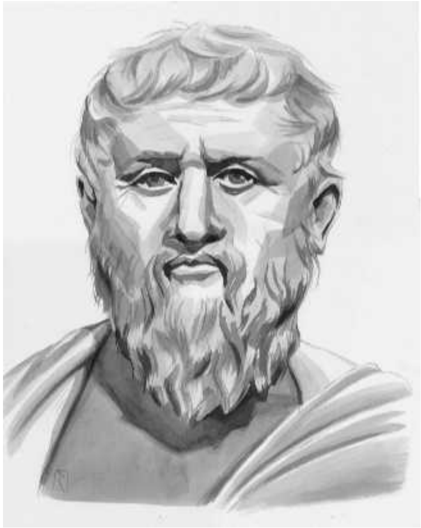
subversive, "leading Athenians may just have been sick and tired of Socrates' endless questioning" (Roochnik, 2002). Also, after the defeat of Athens by Sparta, democracy in Athens was replaced by the regime of the Thirty Tyrants, some of whom were associated with Socrates. When democracy was restored in 403 B.C., Socrates may have been seen, because of his association with the tyrants, as a subversive.

Following his death, it was Socrates' famous student, Plato, who perpetuated and greatly elaborated his philosophy.

PLATO

The writings of **Plato (ca. 427–347 B.C.)** can be divided into two periods. During the first period, Plato essentially reported the thoughts and methods of his teacher, Socrates. When Socrates died, however, Plato went into self-imposed exile in southern Italy, where he came under the influence of the Pythagoreans. After he returned to Athens, he founded his own school, the Academy, and his subsequent writings combined the Socratic method with Pythagorean philosophy. Like Socrates, Plato wished to find something permanent that could be the object of knowledge, but his search for permanence carried him far beyond the kind of essences for which Socrates had settled.



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Plato

The Theory of Forms or Ideas

As we have seen, the Pythagoreans believed that although numbers and numerical relationships were abstractions (they could not be experienced through the senses), they were nonetheless real and could exert an influence on the empirical world. As already mentioned, the Pythagorean theorem is absolutely true when applied to abstract (imagined) triangles but is never completely true when applied to a triangle that exists in the empirical world (for example, one that is drawn on paper). This discrepancy exists because, in the empirical world, the lines making up the right angle will never be exact.

Plato took an additional step. According to his **theory of forms**, everything in the empirical world is a manifestation of a pure form (idea) that exists in the abstract. Thus, chairs, chariots, cats, and Corinthians are inferior manifestations of pure **forms**. For example, the thousands of cats that one encounters are but inferior copies of an abstract idea or form of "catness" that exists in pure form in the abstract. What we experience through the senses results from the interaction of the pure form with matter; and because matter is constantly changing and is experienced through the senses, the result of the interaction must be less perfect than the pure idea before that idea interacts with matter. Plato replaced the essence that Socrates sought with the concept of form as the aspect of reality that was permanent and therefore knowable. That is, Socrates accepted the fact that a thorough definition specified an object's or a concept's essence; whereas for Plato, an object's or a concept's essence was equated with its form. For Plato, essence (form) had an existence separate from its individual manifestations. Socrates and Plato did agree, however, that knowledge could be attained only through reason.

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The Analogy of the Divided Line

What, then, becomes of those who attempt to gain knowledge by examining the empirical world via sensory experience? According to Plato, they are doomed to ignorance or, at best, opinion. The only true knowledge involves grasping the forms themselves, and this can be done only by rational thought. Plato summarized this viewpoint with his famous **analogy of the divided line**, which is illustrated in Figure 2.1.

Imagining is seen as the lowest form of understanding because it is based on images—for example, a portrait of a person is once removed from the person. Reflections in the water are also images because they are a step removed from the objects reflected. We are slightly better off confronting the objects themselves rather than their images, but the best we can do even when confronting objects directly is to form beliefs or opinions about them. Beliefs, however, do not constitute knowledge. Still better is the contemplation of mathematical relationships, but mathematical knowledge is still not the highest type because such knowledge is applied to the solution of practical (empirical) problems, and many of its relationships exist only by definition. That is, mathematical relationships are assumed to be true, but these assumptions could conceivably be false. To think about mathematics in the abstract, however, is better than dealing with images or empirical objects. The highest form of thinking involves embracing the forms themselves, and true intelligence or knowledge results *only* from an understanding of the abstract forms. The "good" or the "form of the good" constitutes the highest form of wisdom because it encompasses all other forms and shows their interrelatedness. The form of the good illuminates all other forms and makes them knowable. It is the highest truth. Later, in Christian theology, the form of the good is equated with God.

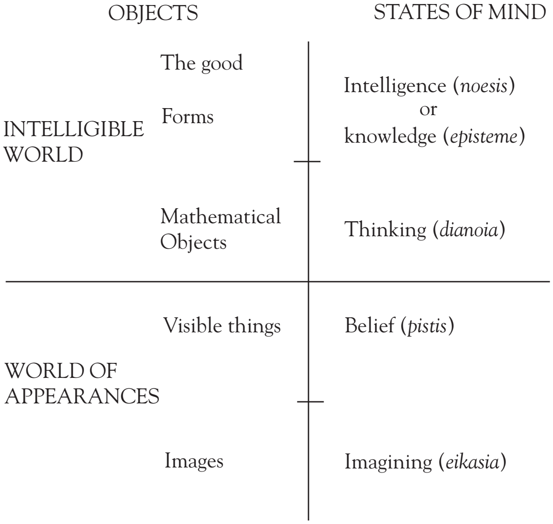

FIGURE 2.1

Plato's analogy of the divided line.

Cornford's translation of Plato's Republic (1941/1968, p. 222.)

The Allegory of the Cave

In the **allegory of the cave** (Jowett, 1986), Plato described fictitious prisoners who have lived their entire lives in the depths of a cave. The prisoners are chained so they can look only forward. Behind them is a path over which individuals pass, carrying a variety of objects. Behind the path a fire is blazing, causing a projection of shadows of the travelers and the objects onto the wall in front of the prisoners. For the prisoners, the projected shadows constitute reality. This corresponds to the lowest form of understanding in the divided line just discussed. Plato then described what might happen if one of the prisoners were to escape his bondage and leave the cave. Turning toward the fire would cause his eyes to ache, and he might decide to return to his world of shadows. If not, he would eventually adjust to the flames and see the individuals and objects of which he had previously seen only shadows. This represents an understanding of empirical events in the divided line. The fire is like the sun, which illuminates those events. Plato then asks us to suppose that the prisoner continues his escape and leaves the cave. Once in the "upper world," the prisoner would be blinded by true reality. Only after a period of adjustment could he see things in this world and recognize that they were more real than the shadows that he had experienced in the

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cave. Finally, Plato asks us to imagine what might happen to the escaped prisoner if he went back into the cave to enlighten his fellow prisoners. Still partially blinded by such an illuminating experience, the prisoner would find it difficult to readjust to the previous life of shadows. He would make mistakes in describing the shadows and in predicting which objects would follow which. This would be evidence enough for his fellow prisoners that no good could come from leaving the world of shadows.

The bound prisoners represent humans who confuse the shadowy world of sense experience with reality. The prisoner who escapes represents the individual whose actions are governed by reason instead of sensory impressions. The escaped prisoner sees the real objects (forms) responsible for the shadows and objects in the cave (sensory information) and thus embraces true knowledge. After such an enlightening experience, an effort is often made to steer others away from ignorance and toward wisdom. The plight of Socrates is evidence of what can happen to the individual attempting to free others from the chains of ignorance.

The Reminiscence Theory of Knowledge

How does one come to know the forms if they cannot be known through sensory experience? The answer to this question involves one of the more difficult aspects of Plato's theory—which otherwise can be seen as anticipating many of the modern ideas of cognitive psychology with respect to matters such as concepts and conceptual categories. Plato's answer was influenced by the Pythagorean notion of the immortality of the soul. According to the Pythagoreans, the highest form of thought was reason, which was a function of the immortal soul. Plato expanded this idea and said that before the soul was implanted in the body, it dwelled in pure and complete knowledge; that is, it dwelled in the realm of the forms. After the soul entered the body, sensory information began to contaminate this knowledge. The only way to arrive at true knowledge is to ignore sensory experience and focus one's thoughts on the contents of the mind. According to Plato's **reminiscence theory of knowledge**, all knowledge is innate and can be attained only through **introspection**, which is the searching of one's inner understanding. At most, sensory experience can only remind one of what was already known. Therefore, for Plato, all knowledge comes from reminiscence, from remembering the experiences the soul had before entering the body. In the *Meno*, Plato clearly presents his reminiscence theory of knowledge:

> Thus the soul, since it is immortal and has been born many times, and has seen all things both here and in the other world, has learned everything that is. So we need not be surprised if it can recall the knowledge of virtue or anything else which, as we see, it once possessed. All nature is akin, and the soul has learned everything, so that when a man has recalled a single piece of knowledge … there is no reason why he should not find out all the rest, if he keeps a stout heart and does not grow weary of the search, for seeking and learning are in fact nothing but recollection. (Hamilton & Cairns, 1961, p. 364)

We see, then, that Plato was a nativist as well as a rationalist because he stressed mental operations as a means of arriving at the truth (rationalism), and that the truth ultimately arrived at was inborn (nativism). He was also an idealist because he believed that ultimate reality consisted of ideas or forms.

The Nature of the Soul

Plato believed not only that the soul had a rational component that was immortal but also that it had two other components: the courageous (sometimes translated as emotional or spirited) and the appetitive. The courageous and appetitive aspects of the soul were part of the body and thus mortal. With his concept of the three-part soul, Plato postulated a situation in which humans were almost always in a state of conflict, a situation not unlike the one Freud described many centuries later. According to Plato, the body has appetites (needs such as hunger, thirst, and sex) that must be met and that play a major motivational role in everyday life. Humans also have varied emotions such as fear, love, and rage. However, if true knowledge is to be attained, the person must suppress the needs of the body and concentrate on rational pursuits, such as introspection. But, because bodily needs do not go away, the person must spend considerable energy keeping them under control. It is the job of the rational component of the soul to postpone or inhibit immediate gratifications when it is to a person's long-term benefit to do so. The person whose rational soul dominates is not impulsive. His or her life is governed by moral principles and future goals, not the immediate satisfaction of biological or emotional needs. The supreme goal in life, according to Plato, should be to free the soul as much as possible from the adulterations of the flesh. In this he agreed with the Pythagoreans.

Plato realized that not everyone is capable of intense rational thought; he believed that in some individuals the appetitive aspect of the soul would dominate, in others the courageous (emotional) aspect of the soul would dominate, and in still others the rational aspect could dominate. In his *Republic*, he discussed a utopian society in which the three types of individuals would have special functions. Those in whom the appetitive aspect dominated would be workers and slaves, those in whom courage (emotion) dominated would be soldiers, and those in whom reason dominated would be philosopher-kings. In Plato's scheme, an inverse relationship exists between concern with bodily experiences and one's status in society. In Book V of the *Republic*, Plato forcibly stated his belief that societies have little chance of survival unless they are led by individuals with the wisdom of philosophers:

> Until philosophers are kings, or the kings and princes of this world have the spirit and power of philosophy, and political greatness and wisdom meet in one, and those of commoner natures who pursue either to the exclusion of the other are compelled to stand aside, cities will never have rest from their evils.… Then only will this our state have a possibility of life and behold the light of day. (Jowett, 1986, p. 203)

We see that Plato was a nativist not only where knowledge was concerned but also where character or intelligence was concerned. He felt that education was of limited value for children of low aptitude. To a large extent then, whether one was destined to be a slave, a soldier, or a philosopher-king was a matter of inheritance. With his discussion of the three character types, Plato created a rudimentary theory of personality. He also had a highly developed philosophy of education that combined his theory of forms with his belief in character types.

Sleep and Dreams

According to Plato, while awake some individuals are better able to rationally control their appetites than are others; during sleep, however, it's another matter. Even with otherwise rational individuals, the baser appetites manifest themselves as they sleep. When asked to which appetites he was referring, Plato answered,

> Those that are aroused during sleep, I said, whenever the rest of the soul, the reasonable, gentle, and ruling part, is slumbering; whereas the wild and animal part, full of food and drink, skips about, casts off sleep, and seeks to find a way to its gratification. You know that there is nothing it will not dare to do at the time, free of any control by shame or prudence. It does not hesitate, as it thinks, to attempt sexual intercourse with a mother or anyone else—man, god, or beast; it will commit any foul murder and does not refrain from any kind of food. In a word, it will commit any foul or shameless deed.… What we want to establish is this: that there is a dangerous, wild, and lawless kind of desire in

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> everyone, even the few of us who appear moderate. This becomes obvious in our sleep. (Grube, 1974, pp. 220–221)

Plato doesn't specifically mention dreams, but it seems clear that he is referring to them and that he anticipates many of the things Freud says about how our dreams reveal our base desires many centuries later (see Chapter 16).

Plato's Legacy

The famed English philosopher and mathematician Alfred North Whitehead (1861–1947) would quip that the history of Western philosophy is but "a series of footnotes to Plato." Certainly, Plato advanced the ideas of the Pythagoreans—those of mathematics and of logical inquiry—that have shaped Western civilization's continued focus on science. As we have commented previously, we can see the roots of cognitive psychology in Plato, and many of the individuals we will consider in subsequent chapters shared in his nativism and rationalism.

Plato created a dualism that divided the human into a body, which was material and imperfect, and a mind (soul), which contained pure knowledge. Furthermore, for Plato the rational soul was immortal. Had philosophy remained unencumbered by theological concerns, perhaps Plato's theory would have been challenged by subsequent philosophers and gradually displaced by more sophisticated views. Aristotle, in fact, went a long way in modifying Plato's position, but the challenge was aborted. The mysticism of early Christianity was combined with Platonic philosophy, creating unchallengeable religious dogma. When Aristotle's writings were rediscovered centuries later, they were also carefully modified and assimilated into church dogma.

ARISTOTLE

Aristotle (384–322 B.C.) was born in the Macedonian city of Stagira, located between the Black Sea and the Aegean Sea. His father was court physician to King Amyntas II of Macedon. Although his father died when Aristotle was a young boy and Aristotle was raised by a guardian, we assume that he received training in medicine. In 367 B.C., Aristotle journeyed to Athens and soon established himself as one of Plato's most brilliant students; he was 17 years old at the time, and Plato was 60. Aristotle continued to study at the Academy until he was 37 years old. When Plato died in 347 B.C., Aristotle moved to Asia Minor, where he engaged in biological and zoological fieldwork. In 343 B.C., Aristotle returned to Macedon and tutored the son of King Philip II, the future Alexander the Great, for about four years. After a few more journeys, Aristotle returned to Athens where, at the age of 48, he took over the Lyceum, a famed public school. In Aristotle's time, the Lyceum would host many teachers, offer regular lectures, and contain a substantial library and large natural science collections—much like a modern university. When Alexander the Great died in 323 B.C., Aristotle fled Athens and died a year later in Chalcis at the age of 63.

Why did Aristotle flee Athens? Macedon, where Aristotle was born, was an ancient Greek-speaking country to the north of Greece. With the goal of unifying diverse Greek communities into a powerful Greco-Macedonian nation, King Philip of Macedon invaded and conquered a number of Greek city-states, including Athens. When Philip was assassinated in 336 B.C., his 19-year-old son Alexander (Aristotle's ex-student) became ruler, and his subsequent military accomplishments are legendary. Although Aristotle had many disagreements with Alexander, both preferred "Greek solidarity to city patriotism" (Durant, 1926/1961, p. 94). When Alexander died in 323 B.C. at the age of 32, the Macedonian leadership was overthrown in Athens, and Athenian independence was again proclaimed. Undoubtedly because of his association with the Macedonians, Aristotle faced the trumped-up charge of impiety brought against him. He was accused of having taught that prayer and sacrifice were ineffective. This, of course, is reminiscent of what happened to Socrates. Unlike Socrates, however, Aristotle chose to flee Athens rather than meet his inevitable fate, saying, "He would not give Athens a

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chance to sin a second time against philosophy" (Durant, 1926/1961, p. 94).

Importantly for us, Aristotle was the first philosopher to extensively treat many topics that were later to become part of psychology. In his vast writings, he covered memory, reasoning, sensation, motivation, morality, social behavior, education, development, geriatrics, sleep and dreams, language, and learning. He also began his book *De Anima* (*On the Soul*) with what is considered to be the first history of psychology. Taken alone, Aristotle's contributions to psychology are truly impressive. It must be realized, however, that with the possible exception of mathematics, he made substantial contributions to almost every branch of knowledge. The influence of his thoughts on such philosophical and scientific topics as logic, metaphysics, optics, physics, biology, ethics, politics, rhetoric, and poetics have lasted to the present time.

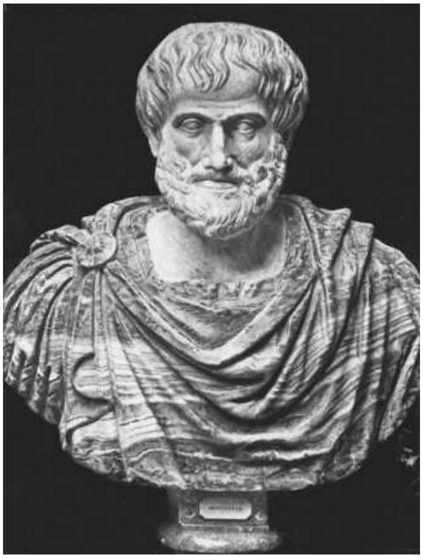
The Basic Difference between Plato and Aristotle

Both Plato and Aristotle were primarily interested in essences or truths that go beyond the mere appearance of things, but their methods for discovering those essences were distinctly different. For Plato, essences corresponded to the forms that existed *independently* of nature and that could be arrived at only by ignoring sensory experience and turning one's thoughts inward. For Aristotle, essences existed but could best become known by studying nature. He believed that if enough individual manifestations of a principle or phenomenon were investigated, eventually one could infer the essence that they exemplified. In the opening passage of his *Metaphysics*, Aristotle demonstrates that his attitude toward sensory information is much friendlier than was Plato's.

> All men by nature desire to know. An indication of this is the delight we take in our senses; for even apart from their usefulness they are loved for themselves; and above all others the sense of sight. For not only with a view to action, but even when we are not going to do anything, we prefer sight to almost everything else. The reason is that this, most of all the senses, makes us know and brings to light many differences between things. (Barnes, 1984, Vol. 2, p. 1552)

Some writers describe Plato as the patriarch of rationalism, and Aristotle then as the forerunner of empiricism, but that is misleading in its simplicity. In fact, Aristotle's philosophy shows the difficulty that is often encountered when attempting to clearly separate the philosophies of rationalism and empiricism. As noted in Chapter 1, the rationalist claims that logical, mental operations must be used to gain knowledge, and the empiricist emphasizes the importance of sensory information in gaining knowledge. Aristotle embraced both rationalism and empiricism. He believed that the mind must be employed before knowledge can be attained (rationalism) but that the object of rational thought is the information furnished by the senses (empiricism).

The general principles that Plato and Aristotle (and other philosophers) thought were real and knowable have been referred to in different ways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Aristotle

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through the years—for example, as first principles, essences, or universals. In each case, the assumption is that something basic existed that could not be discovered by studying only individual instances or manifestations of the abstract principle involved. Some type of rational activity is needed to find the principle (essence) underlying individual cases. The search for first principles, essences, or universals characterized most early philosophy and, in a sense, continues in modern science as the search for laws governing nature. In Chapter 20, we will examine Ludwig Wittgenstein's criticism of the concept of essence and his proposed alternative to it.

For Plato, first principles are arrived at by pure thought; for Aristotle, they could also be attained by examining nature directly. For Plato, all knowledge exists independently of nature; for Aristotle, nature and knowledge are inseparable. In Aristotle's view, therefore, the body is not a hindrance in the search for knowledge, as it is for Plato and the Pythagoreans. Also, Aristotle disagreed with Plato on the importance of mathematics. For Aristotle, logical analysis (such as the syllogism) is a powerful tool, but often his emphasis was instead on the careful examination of nature by observation and classification. Here we see again the empirical component of Aristotle's philosophy. In Aristotle's Lyceum, he made an incredibly large number of observations of physical and biological phenomena, all of which he then categorized. Through this method of observation, definition, and classification, Aristotle compiled what has been called an encyclopedia of nature. He was chiefly interested in studying the things in the empirical world and learning their functions. Because Aristotle sought to explain several psychological phenomena in biological terms, we recognize him as one of the first physiological psychologists (D. N. Robinson, 1986).

In some ways, where Plato's philosophy followed in the Pythagorean, mathematical tradition, Aristotle's was more in the Hippocratic, biological tradition. The views of Plato and Aristotle concerning the sources of knowledge set the stage for epistemological inquiry lasting to the present time. We could evaluate almost every subsequent philosopher (and most psychologists) in terms of their agreement or disagreement with the views of Plato or Aristotle.

Causation and Teleology

To know any *thing*, according to Aristotle, we must understand four aspects of it. That is, everything in nature follows from these four causes:

- **Material cause** is the kind of matter of which a thing is made. For example, a statue is made of marble.
- **Formal cause** is the particular form, or pattern, of a thing. For example, a given piece of marble may be in the form of Venus.
- **Efficient cause** is the force that transforms the material thing into a certain form—for example, the energy of a sculptor.
- **Final cause** is the purpose for which a thing exists. In the case of a statue of Venus, the purpose may be to arouse pleasure in those who view it. The final cause is that for the sake of which something exists.

Aristotle's philosophy exemplifies **teleology** because, for him, everything in nature exists for a purpose. By *purpose*, however, Aristotle did not mean conscious intention. Rather, he meant that everything in nature has a function built into it. This built-in purpose, or function, is called **entelechy**. Entelechy keeps an object moving or developing in its prescribed direction until its full potential is reached. The final cause of living things is part of their nature; it exists as a potentiality from the organism's very inception. An acorn has the potential to become an oak tree, but it cannot become a frog or an olive tree. In other words, the purpose, or entelechy, of an acorn is to become an oak tree. Nature is characterized by the change and motion that occurs as objects are slowly transformed from their potentialities to their actualities—that is, as objects move toward their final causes or purposes, such as when an acorn becomes an oak tree. Aristotle also saw the final cause, or purpose, of something as its essence.

According to Aristotle, all natural things, both animate and inanimate, have a purpose built into them. In addition, however, nature itself has a grand design or purpose. Although Aristotle believed that the categories of things in nature remain fixed, thus denying evolution, he spoke of a grand hierarchy among all things. The *scala naturae* refers to the idea that nature is arranged in a hierarchy ranging from neutral matter to the **unmoved mover**, which is pure actuality and is the cause of everything in nature. For Aristotle, the unmoved mover is what gives all natural objects their purposes. In his *scala naturae*, the closer to the unmoved mover something is, the more perfect it is. Among animals, humans were closest to the unmoved mover, with all other animals at various distances behind us. Although Aristotle did not accept evolution, his *scala naturae* does create a phylogenetic scale of sorts, making it possible to study "lower" animals in order to understand humans. Such information will always be of limited value, however, because for Aristotle, humans were unique among the animals. Again, Aristotle's position was thoroughly teleological: All objects in nature have a purpose, and nature itself has a purpose.

The Hierarchy of Souls. For Aristotle, as for most Greek philosophers, a soul is that which gives life; therefore, all living things possess a soul. According to Aristotle, there are three types of souls, and a living thing's potential (purpose) is determined by what type of a soul it possesses.

- A **vegetative (or nutritive) soul** is possessed by plants. It allows only growth, the assimilation of food, and reproduction.
- A **sensitive soul** is possessed by animals but not plants. In addition to the vegetative functions, organisms that possess a sensitive soul sense and respond to the environment, experience pleasure and pain, and have a memory.
- A **rational soul** is possessed only by humans. It provides all the functions of the other two souls but also allows thinking or rational thought.

Because it is the soul that gives a living organism its distinctive properties, to ask whether body and soul exist independently was, for Aristotle, a meaningless question: "We can dismiss as unnecessary the question whether the soul and the body are one: it is as though we were to ask whether the wax and its shape are one" (Barnes, 1984, Vol. 1, p. 657).

Sensation and Reason

Aristotle said that the senses provide information about the environment: sight, hearing, taste, touch, and smell. Unlike earlier philosophers (such as Empedocles and Democritus), Aristotle did not believe objects sent off tiny copies of themselves (eidola). Rather, he thought that perception was explained by the motion of objects that stimulate one of the senses. The movement of environmental objects creates movements through different media, and each of the senses is maximally sensitive to movements in a certain medium. For example, seeing results from the movement of light caused by an object in relation to the sensory abilities of the eye. In this way, Aristotle explained how we could actually sense environmental objects without those objects sending off physical copies of themselves. Unlike Plato, Aristotle believed we could generally trust our senses to yield an accurate representation of the environment.

Common Sense and Reason. As important as sensory information was to Aristotle, it was only the first step in acquiring knowledge. In other words, *sensory experience is a necessary, but not a sufficient, element in the attainment of knowledge*. In the first place, each sensory system provides isolated information about the environment that by itself is not very useful. For example, seeing a baby tossing and turning provides a clue as to its condition, hearing it cry provides another clue, and smelling it may give a big clue as to why it is so uncomfortable. But, it is the combined information from all these senses that allows for the most complete interactions with the environment.

Aristotle postulated **common sense** as the mechanism that coordinated the information from all the senses. The common sense, like all other mental functions, was assumed to be located in the heart. The job of common sense is to synthesize

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sensory experience, thereby making it more meaningful. However, sensory information, even after synthesized by common sense, could provide information only about particular instances of things. **Passive reason** involves the utilization of synthesized experience for getting along effectively in everyday life, but it does not result in an understanding of essences, or first principles. The abstraction of first principles from one's many experiences can only be accomplished by **active reason**, which Aristotle considers the highest form of thinking. He therefore delineated levels of knowing or understanding much like Plato's divided line:

- *Active reason:* The abstraction of principles, or essences, from synthesized experience
- *Passive reason:* Utilization of synthesized experience
- *Common sense:* Synthesized experience
- *Sensory information:* Isolated experience

To see how these levels of understanding relate, consider how we experience electricity through the various senses: sight (seeing an electrical discharge), pain (being shocked), and hearing (hearing the electrical discharge). These experiences correspond to the level of sense reception. The common sense would indicate that all these experiences had a common source—electricity. Passive reason would suggest how electricity could be used in a variety of practical ways, whereas active reason would seek the general laws governing electricity and an understanding of its essence. What starts as a set of empirical experiences ends as a search for the principles that can explain those experiences.

The active reason part of the soul provides humans with their highest purpose. That is, it provides their entelechy. Just as the ultimate goal of an acorn is to become an oak tree, the ultimate goal of humans is to engage in active reason. Aristotle also believed that acting in accordance with one's nature causes pleasure and that acting otherwise brings pain. In the case of humans, engaging in active reason is the source of greatest pleasure. On this matter, Aristotle is essentially in agreement with Socrates and Plato. Also, because Aristotle postulated an inner potential in humans that they may or may not reach, his theory represents psychology's first self-actualization theory. The self-actualization theories of Jung, Maslow, and Rogers reflect Aristotle's thoughts on the human entelechy.

With his concept of active reason, Aristotle inserted a more metaphysical component into what was otherwise mostly a naturalistic psychology. He considered the active reason part of the soul immortal, but when it leaves the body upon death, it carries no recollections with it. Aristotle considered it a mechanism for pure thought and believed it to be identical for all humans; it did not retain the moral character of its prior possessor, and there was no union or reunion with God. The active reason part of the soul went neither to heaven nor to hell. Later, however, the Christianized version of the Aristotelian soul would be characterized by all these things.

Another intriguing component in Aristotle's philosophy is his notion of the unmoved mover. As stated earlier, for Aristotle, everything in nature has a purpose that is programmed into it. This purpose, or entelechy, explained why a thing was like it was and why it did what it did. But if everything in nature has a purpose, what causes that purpose? As we have seen, Aristotle postulated an unmoved mover, or that which caused everything else but was not caused by anything itself. For Aristotle, the unmoved mover set nature in motion and did little else; it was a logical necessity, not a deity. Along with Aristotle's notion of the immortal aspect of the soul, the Christians also found his unmoved mover very much to their liking.

Memory and Recall

In keeping with the empirical aspect of his philosophy, Aristotle, in his *On Memory*, explained memory and recall as the results of sense perception. This contrasts with Plato's explanation, which was essentially nativistic. **Remembering**, for Aristotle, was a spontaneous recollection of something that had been previously experienced. For example, you see a person and remember that you saw that person before and perhaps engaged in a certain conversation. **Recall**, however, involves an actual mental search for a past experience. It was in conjunction with recall that Aristotle postulated his **laws of association**. The most basic law of association is the **law of contiguity**, which states that when we think of something, we also tend to think of things that were experienced along with it. The **law of similarity** states that when we think of something, we tend to think of things similar to it. The **law of contrast** states that when we think of something, we also tend to think of things that are its opposite. Aristotle said that on rare occasions a strong association can be formed between two events after experiencing them together just once. Typically, however, the more often events are experienced together, the stronger will be their association. Thus, Aristotle implied the **law of frequency**, which states that, in general, the more often experiences occur together, the stronger will be their association. According to Aristotle, events can be associated naturally, such as when thunder follows lightning, or by custom, such as learning the letters of the alphabet or associating a certain name with a certain person. In both cases, it is generally the frequency of occurrence that determines the strength of association.

Aristotle's laws of association were to become the basis of learning theory for more than 2,000 years. In fact, the concept of mental association is still at the heart of most theories of learning. The belief that one or more laws of association can be used to explain the origins of ideas, the phenomena of memory, or how complex ideas are formed from simple ones came to be called **associationism**.

Imagination and Dreaming

We have seen that Aristotle's philosophy had both rational and empirical components. For example, his account of memory and recall was very empirical, and we see that again in his explanation of **imagination** and dreaming. According to Aristotle, when sensations occur, they create images that long outlast the stimulation that caused them. The retention of these images is what constitutes memory. These images also create the important link between sensation and rational thought because it is the images provided by experience that are pondered by the passive and active intellects. Imagination, then, is explained as the lingering effects of sensory experience. Aristotle did question the reliability of the products of imagination. Sensations, he said, tend to be free of error because of the close relationship between objects of sense and the sense organs. Because imagination is removed from this relationship, it is much more susceptible to error.

Aristotle also explained dreaming in terms of the images of past experience. During sleep, the images of past experience may be stimulated by events inside or outside the body. The reasons that our residual impressions (images) may seem odd during a dream are that (1) during sleep, the images are not organized by reason; and (2) while awake, our images are coordinated with or controlled by ongoing sensory stimulation, which interacts with the images of previous experience, but during sleep this does not occur.

Aristotle was extremely skeptical about a dream's ability to provide information about future events. Most often we dream about activities in which we have recently engaged, but it is possible that a course of action is dreamed about so vividly that it will suggest an actual course of action in the dreamer's life. However, according to Aristotle, most cases of apparent prophecy by dreams are to be taken as mere coincidences:

> [Just as] mentioning a particular person is neither token nor cause of this person's presenting himself, so, in the parallel instance, the dream is, to him who has seen it, neither token nor cause of its fulfillment, but a mere coincidence. Hence the fact that many dreams have no "fulfillment," for coincidences do not occur according to any universal or general law.… For the principle which is expressed in the gambler's maxim: "If you make many throws your luck must change," holds good [for dreams] also. (Barnes, 1984, Vol. 1, p. 737)

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It is interesting to note that the eminent Roman statesman and philosopher Cicero (106–43 B.C.) agreed with Aristotle's analysis of dreams:

> From the visions of drunkards and madmen one might, doubtless, deduce innumerable consequences by conjecture, which might seem to be presages of future events. For what person who aims at a mark all day long will not sometimes hit it? We sleep every night; and there are very few on which we do not dream; can we wonder then that what we dream sometimes comes to pass? (Yonge, 1997, p. 251)

There was a sense, however, in which Aristotle believed dreams were capable of predicting important future events. Because sensations are often exaggerated in dreams, subtle bodily changes may be reflected in dreams but not during wakefulness. For this reason, it makes sense for physicians to analyze dreams to detect the early signs of disease (Barnes, 1984, Vol. 1, pp. 736–737).

Motivation and Emotion

Happiness, for Aristotle, was doing what is natural because doing so fulfills one's purpose. For humans, our purpose is to think rationally, and therefore doing so brings the greatest happiness. However, humans are also biological organisms characterized by the functions of nutrition, sensation, reproduction, and movement. That is, although humans are distinct from other animals (because of our reasoning ability), we do share many of their motives. As with other animals, much human behavior is motivated by appetites. Action is always directed at the satisfaction of an appetite. Thus, behavior is motivated by such internal states as hunger, sexual arousal, thirst, or the desire for bodily comfort. Because the existence of an appetite causes discomfort, it stimulates activity that will eliminate it. If the activity is successful, the animal or person experiences pleasure. Much human behavior, then, like all animal behavior, is hedonistic; its purpose is to bring pleasure or to avoid pain.

Unlike other animals, however, we can use our rational powers to inhibit our appetites. Furthermore, our greatest happiness does not come from satisfying our biological needs. Rather, it comes from exercising our rational powers to their fullest. Given the fact that humans have both appetites and rational powers, conflict often arises between the immediate satisfaction of our appetites and the more remote rational goals. On the portals of the temple of Apollo at Delphi, there were two inscriptions. One was "Know thyself," which, as we saw, so inspired Socrates. The other was "Nothing in excess." The latter reflects the high esteem with which the Greeks held self-control, and Aristotle was no exception.

In *Nicomachean Ethics* (Ross, 1990), Aristotle described the best life as one lived in moderation; that is, one lived according to the **golden mean**. As examples, he described courage as the mean between cowardice and foolhardiness, temperance as the mean between abstinence and self-indulgence, and generosity as the mean between meanness (stinginess) and extravagance. A life of moderation requires the rational control of one's appetites. Even the best of humans, however, are capable of acting hedonistically rather than rationally: "For desire is a wild beast, and passion perverts the minds of rulers, even when they are the best of men" (Barnes, 1984, Vol. 2, p. 2042). According to Aristotle, the lives of many humans are governed by nothing more than the pleasure and pain that come from the satisfaction and frustration of appetites. These people are indistinguishable from animals. Appetites and reason are part of every human, but his or her character is revealed by which of the two dominates.

Interestingly, Aristotle described what would much later be called an approach-approach conflict and the problem such a conflict can cause. The traditional example of this conflict is a hungry donkey starving to death between two equally desirable stacks of hay. Aristotle said, "[Consider] the man who, though exceedingly hungry and thirsty, and both equally, yet being equidistant from food and drink, is therefore bound to stay where he is" (Barnes, 1984, Vol. 1, p. 486).

In general, in Aristotelian philosophy, the emotions had the function of amplifying any existing tendency. For example, people might run more quickly if they were frightened than if they were merely jogging for exercise. Also, the emotions provide a motive for acting—for example, people might be inclined to fight if they are angry. However, the emotions may also influence how people perceive things; that is, they may cause *selective perception*. Aristotle gave the following examples:

> We are easily deceived respecting the operations of sense-perception when we are excited by emotion, and different persons according to their different emotions; for example, the coward when excited by fear and the amorous person by amorous desire; so that with but little resemblance to go upon, the former thinks he sees his foes approaching, the latter that he sees the object of his desire; and the more deeply one is under the influence of the emotion, the less similarity is required to give rise to these impressions. Thus, too, in fits of anger, and also in all states of appetite, all men become easily deceived, and more so the more their emotions are excited. (Barnes, 1984, Vol. 1, p. 732)

We can engage here in a bit of presentism and note that Aristotle made several mistakes. For example, he assigned thinking and common sense to the heart and claimed that the main function of the brain was to cool the blood. Although many of his observations were eventually shown to be incorrect, Aristotle did promote empirical observation as a method for attaining knowledge, and in doing so, he brought Greek philosophy and science to new heights.

THE IMPORTANCE OF EARLY GREEK PHILOSOPHY

To realize the significance of the early Greeks, remembering Popper is useful. As we saw in Chapter 1, Popperian science consists of specifying a problem, proposing solutions to the problem, and attempting to refute the proposed solutions. What survives in such a process is a solution to a problem that, at the moment, cannot be refuted. Again, the highest status that a proposed solution to a problem can ever attain is "not yet disconfirmed." The assumption in Popper's view of science is that all scientific "facts" and "theories" eventually will be found to be false.

What has this to do with the importance of early Greek philosophy? In Popper's view, science began when humans first began to question the stories they were told about themselves and the world. According to Popper, this willingness to engage in critical discussion was the beginning of an extremely important tradition:

> Here is a unique phenomenon, and it is closely connected with the astonishing freedom and creativeness of Greek philosophy. How can we explain this phenomenon? *What we have to explain is the rise of a tradition.* It is a tradition that allows or encourages critical discussions between various schools and, more surprisingly still, within one and the same school. For nowhere outside the Pythagorean school do we find a school devoted to the preservation of a doctrine. Instead we find changes, new ideas, modifications, and outright criticism of the master. (1958, p. 27)

As we have seen, Popper attributed the founding of this new tradition of freedom to Thales, who not only tolerated criticism but encouraged it. According to Popper, this was a "momentous innovation" because it broke with the dogmatic tradition that permitted only one true doctrine by allowing a plurality of doctrines, all attempting to approach the truth via critical discussion. Coupled with this tradition of free, critical discussion is the realization that our inquiries are never final but always tentative and capable of improvement. Popper said of this tradition,

> It … leads, almost by necessity, to the realization that our attempts to see and to find the truth are not final, but open to improvement; that our knowledge, our

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> doctrine, is conjectural; that it consists of guesses, of hypotheses, rather than of final and certain truths; and that criticism and critical discussion are our only means of getting nearer to the truth. It thus leads to the tradition of bold conjectures and of free criticism, the tradition which created the rational or scientific attitude, and with it our Western civilization. (1958, p. 29)

Aristotle's death, in 322 B.C., is often seen as marking the end of the Golden Age of Greece, which had started about 300 years earlier with the philosophy of Thales. Most, if not all, of the philosophical concepts pursued since that Golden Age were first introduced during this amazing period in history. After Aristotle's death, most thinkers either began to rely on the teachings of past authorities or turned their attention to questions concerning religion. It was not until the Renaissance, many centuries after Aristotle's death, that the critical tradition of the early Greek philosophers was rediscovered and revived.

SUMMARY

Primitive humans looked upon everything in nature as if it were alive—this view was called animism. Moreover, they tended to project human feelings and emotions onto nature, and this was called anthropomorphism. A spirit or ghost was thought to reside in everything, giving it life. An array of magical practices evolved that were designed to influence various spirits. These practices gave humans the feeling that they had some control over nature. Early Greek religion was of two main types: Olympian, which consisted of a number of gods whose activities were very much like those of upper-class Greeks, and Dionysiac-Orphic, which preached that the soul was a prisoner of the body and that it longed to be released so that it could once again dwell among the gods.

The first philosophers emphasized natural explanations instead of supernatural ones. They sought a primary element, called the physis, from which everything was made. For Thales, the physis was water; for Anaximander, it was the boundless; for Heraclitus, it was fire; for Parmenides, it was the "one" or "changelessness"; for Pythagoras, it was in numbers; for Democritus, it was the atom; for Hippocrates and Empedocles, there were four primary elements—water, earth, fire, and air; and for Anaxagoras, there was an infinite number of elements. The earliest Greek philosophers were called cosmologists because they sought to explain the origin, structure, and processes of the universe (cosmos).

The debate between Heraclitus, who believed everything was constantly changing, and Parmenides, who believed nothing ever changed, raised a number of epistemological questions such as, What, if anything, is permanent enough to be known with certainty? and, If sensory experience provides information only about a continually changing world, how can it be a source of knowledge? These and related questions have persisted to the present.

Most of the first philosophers were monists because they made no distinction between the mind and the body; whatever element or elements they arrived at were supposed to account for everything. In Pythagoras, however, we have a full-fledged dualism between the mind and the body and between the physical and the abstract. Numbers were abstractions but were real, and they could be known only by rational thought, not by sensory experience. Sensory experience could only inhibit attainment of abstract knowledge and was to be avoided. The mind, or soul, was thought to be immortal.

Early Greek medicine was temple medicine based on superstition and magical practices. Through the efforts of such individuals as Alcmaeon and Hippocrates, medical practice became objective and naturalistic. Displacing such beliefs as that illness was due to the possession of spirits was the belief that health resulted from a balance among bodily elements or processes.

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The Sophists concluded that there were many equally valid philosophical positions. "Truth" was believed to be a function of a person's education, personal experiences, culture, and beliefs; and whether this truth was accepted by others depended on one's communicative skills. Socrates agreed with the Sophists that truth was subjective, but he also believed that a careful examination of one's subjective experiences would reveal certain concepts that were stable and knowable and that, when known, would generate proper conduct.

Plato, influenced by the Pythagoreans, took Socrates' belief an additional step by saying that ideas, or concepts, had an independent existence. For Plato, ideas or forms were the ultimate reality, and they could be known only by reason. Sensory experience leads only to ignorance—or at best, opinion—and should be avoided. The soul, before becoming implanted in the body, dwells in pure and complete knowledge, which can be remembered if one turns one's thoughts inward and away from the empirical world. For Plato, knowledge results from remembering what the soul experienced prior to its implantation in the body. This is called the reminiscence theory of knowledge. Plato believed that the rational powers of the mind (rationalism) should be turned inward to rediscover ideas that had been present at birth (nativism).

Aristotle was also interested in general concepts instead of isolated facts, but unlike Plato, he believed that the way to arrive at these concepts was to examine nature. Instead of urging the avoidance of sensory experience, he claimed that it was the source of all knowledge. Aristotle's philosophy relied heavily on empiricism because he believed that concepts are derived from the careful scrutiny of sensory observations. He believed that all things contained an entelechy, or purpose. An acorn, for example, has the potential to become an oak tree, and its purpose is to do so. There are three categories of living things: those possessing a vegetative soul, those possessing a sensitive soul, and those possessing a rational soul. Humans alone possess a rational soul, which has two functions: passive reason and active reason. Passive reason ponders information from the five senses and from the common sense, which synthesizes sensory information. Active reason is used to isolate enduring concepts (essences) that manifest themselves in sensory experience. Aristotle considered active reason immortal. He also postulated an unmoved mover that was the entelechy for all of nature; it caused everything else but was not itself caused by anything. Aristotle believed that nature was organized on a grand scale ranging from formless matter to plants, to animals, to humans, and finally to the unmoved mover. Because humans have much in common with other animals, we can learn about ourselves by studying them.

Aristotle distinguished between memory, which was spontaneous, and recall, which was the active search for a recollection of a past experience. It was with regard to recall that Aristotle postulated his laws of association—the laws of contiguity, similarity, contrast, and frequency. Aristotle explained imagination and dreaming as the pondering of images that linger after sensory experience has ceased. Contrary to what almost everyone else at the time believed, Aristotle believed that dreams do not foretell the future, and if they appear to do so, it is simply coincidence. Humans are motivated by their very nature to engage their rational powers in an effort to attain knowledge. However, humans have appetites not unlike those of other animals. The presence of an appetite stimulates behavior that will satisfy it. When an appetite is satisfied, the person or animal experiences pleasure; when it is not satisfied, pain is experienced. Human rationality can and should be used to control appetites and emotions, but both sometimes overwhelm even the best of humans. The best life is one lived in accordance with the golden mean—a life of moderation. Emotions amplify ongoing thoughts and behavior and sometimes cause people to selectively perceive or misperceive events in the environment. Although Aristotle made several mistakes, his empirical approach to attaining knowledge brought Greek philosophy to new heights.

Early Greek philosophy was significant because it replaced supernatural explanations with naturalistic ones and because it encouraged the open criticism and evaluation of ideas.

DISCUSSION QUESTIONS

1. Summarize the major differences between Olympian and Dionysiac-Orphic religion.
2. Why were the first philosophers called physicists? List the physes arrived at by Thales, Anaximander, Heraclitus, Parmenides, Pythagoras, Empedocles, Anaxagoras, and Democritus.
3. What important epistemological question did Heraclitus's philosophy raise?
4. Give examples of how logic was used to defend Parmenides' belief that change and motion were illusions.
5. Differentiate between elementism and reductionism and give an example of each.
6. What were the major differences between temple medicine and the type of medicine practiced by Alcmaeon and the Hippocratics?
7. How did the Sophists differ from the philosophers who preceded them? What was the Sophists' attitude toward knowledge? In what way did Socrates agree with the Sophists, and in what way did he disagree?
8. What, for Socrates, was the goal of philosophical inquiry? What method did he use in pursuing that goal?
9. Describe Plato's theory of forms.
10. In Plato's philosophy, what was the analogy of the divided line?
11. Summarize Plato's cave allegory. What points was Plato making with this allegory?
12. Discuss Plato's reminiscence theory of knowledge.
13. Compare Aristotle's attitude toward sensory experience with that of Plato.
14. According to Aristotle, what were the four causes of things?
15. Discuss Aristotle's concept of entelechy.
16. Describe Aristotle's concept of *scala naturae*, and indicate how that concept justifies a comparative psychology.
17. Discuss Aristotle's concept of soul.
18. Discuss the relationship among sensory experience, common sense, passive reason, and active reason.
19. Summarize Aristotle's views on imagination and dreaming.
20. Discuss Aristotle's views on happiness. What, for him, provided the greatest happiness? What characterized the life lived in accordance with the golden mean?
21. Discuss Aristotle's views on emotions.
22. In Aristotle's philosophy, what was the function of the unmoved mover?
23. Describe the laws of association that Aristotle proposed.
24. Summarize the reasons Greek philosophy was important to the development of Western civilization.

SUGGESTIONS FOR FURTHER READING

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GLOSSARY

Active reason According to Aristotle, the faculty of the soul that searches for the essences or abstract concepts that manifest themselves in the empirical world. Aristotle thought that the active reason part of the soul was immortal.

Alcmaeon (fl. ca. 500 B.C.) One of the first Greek physicians to move away from the magic and superstition of temple medicine and toward a naturalistic understanding and treatment of illness.

Allegory of the cave Plato's description of individuals who live their lives in accordance with the shadows of reality provided by sensory experience instead of in accordance with the true reality beyond sensory experience.

Analogy of the divided line Plato's illustration of his contention that there is a hierarchy of understanding. The lowest type of understanding is based on images of empirical objects. Next highest is an understanding of empirical objects themselves, which results only in opinion. Next is an understanding of abstract mathematical principles. Then comes an understanding of the forms. The highest understanding (true knowledge) is an understanding of the form of the good that includes a knowledge of all forms and their organization.

Anaxagoras (ca. 500–428 B.C.) Postulated an infinite number of elements (seeds) from which everything is made. He believed that everything contains all the elements and that a thing's identity is determined by which elements predominate. An exception is the mind, which contains no other element but may combine with other elements, thereby creating life.

Anaximander (ca. 610–547 B.C.) Suggested the infinite or boundless as the physis and formulated a rudimentary theory of evolution.

Animism The belief that everything in nature is alive.

Anthropomorphism The projection of human attributes onto nonhuman things.

Aristotle (384–322 B.C.) Believed sensory experience to be the basis of all knowledge, although the five senses and the common sense provided only the information from which knowledge could be derived. Aristotle also believed that everything in nature had within it an entelechy (purpose) that determined its potential. Active reason, which was considered the immortal part of the human soul, provided humans with their greatest potential, and therefore fully actualized humans engage in active reason. Because everything was thought to have a cause, Aristotle postulated an unmoved mover that caused everything in the world but was not itself caused. (*See also* **Unmoved mover**.)

Associationism The philosophical belief that mental phenomena, such as learning, remembering, and imagining, can be explained in terms of the laws of association. (*See also* **Laws of association**.)

Becoming According to Heraclitus, the state of everything in the universe. Nothing is static and unchanging; rather, everything in the universe is dynamic—that is, becoming something other than what it was.

Being Something that is unchanging and thus, in principle, is capable of being known with certainty. Being implies stability and certainty; becoming implies instability and uncertainty.

Common sense According to Aristotle, the faculty located in the heart that synthesizes the information provided by the five senses.

Cosmology The study of the origin, structure, and processes governing the universe.

Democritus (ca. 460–370 B.C.) Offered atoms as the physis. Everything in nature, including humans, was explained in terms of atoms and their activities. His was the first completely materialistic view of the world and of humans.

Dionysiac-Orphic religion Religion whose major belief was that the soul becomes a prisoner of the body because of some transgression committed by the soul. The soul continues on a circle of transmigrations until it has been purged of sin, at which time it can escape its earthly existence and return to its pure, divine existence

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among the gods. A number of magical practices were thought useful in releasing the soul from its bodily tomb.

Efficient cause According to Aristotle, the force that transforms a thing.

Eidola (plural, eidolon) A tiny replication that some early Greek philosophers thought emanated from the surfaces of things in the environment, allowing the things to be perceived.

Elementism The belief that complex processes can be understood by studying the elements of which they consist.

Empedocles (ca. 490–430 B.C.) Postulated earth, fire, air, and water as the four basic elements from which everything is made and two forces, love and strife, that alternately synthesize and separate those elements. He was also the first philosopher to suggest a theory of perception, and he offered a theory of evolution that emphasized a rudimentary form of natural selection.

Entelechy According to Aristotle, the purpose for which a thing exists, which remains a potential until actualized. Active reason, for example, is the human entelechy, but it exists only as a potential in many humans.

Essence That indispensable characteristic of a thing that gives it its unique identity.

Final cause According to Aristotle, the purpose for which a thing exists.

Formal cause According to Aristotle, the form of a thing.

Forms According to Plato, the pure, abstract realities that are unchanging and timeless and therefore knowable. Such forms create imperfect manifestations of themselves when they interact with matter. It is these imperfect manifestations of the forms that are the objects of our sense impressions. (*See also* **Theory of forms**.)

Galen (ca. A.D. 130–200) Associated each of Hippocrates' four humors with a temperament, thus creating a rudimentary theory of personality.

Golden mean The rule Aristotle suggested people follow to avoid excesses and to live a life of moderation.

Gorgias (ca. 485–380 B.C.) A Sophist who believed the only reality a person can experience is his or her subjective reality and that this reality can never be accurately communicated to another individual.

Heraclitus (ca. 540–480 B.C.) Suggested fire as the physis because in its presence nothing remains the same. He viewed the world as in a constant state of flux and thereby raised the question as to what could be known with certainty.

Hippocrates (ca. 460–377 B.C.) Considered the father of modern medicine because he assumed that disease had natural causes, not supernatural ones. Health prevails when the four humors of the body are in balance, disease when there is an imbalance. The physician's task was to facilitate the body's natural tendency to heal itself.

Imagination According to Aristotle, the pondering of the images retained from past experiences.

Inductive definition The technique used by Socrates that examined many individual examples of a concept to discover what they all had in common.

Introspection The careful examination of one's subjective experiences.

Law of contiguity A thought of something will tend to cause thoughts of things that are usually experienced along with it.

Law of contrast A thought of something will tend to cause thoughts of opposite things.

Law of frequency In general, the more often events are experienced together, the stronger they become associated in memory.

Law of similarity A thought of something will tend to cause thoughts of similar things.

Laws of association Those laws thought responsible for holding mental events together in memory. For Aristotle, the laws of association consisted of the laws of contiguity, contrast, similarity, and frequency.

Magic Various ceremonies and rituals that are designed to influence spirits and nature.

Material cause According to Aristotle, what a thing is made of.

Nihilism The belief that because what is considered true varies from person to person, any search for universal (interpersonal) truth will fail. In other words, there is no one truth, only truths. The Sophists were nihilists.

Olympian religion The religion based on a belief in the Olympian gods as they were described in the Homeric poems. Olympian religion tended to be favored by the privileged classes, whereas peasants, laborers, and slaves tended to favor the more mystical Dionysiac-Orphic religion. (*See also* **Dionysiac-Orphic religion**.)

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Parmenides (born ca. 515 B.C.) Believed that the world was solid, fixed, and motionless and therefore that all apparent change or motion was an illusion.

Passive reason According to Aristotle, the practical utilization of the information provided by the common sense.

Physis A primary substance or element from which everything is thought to be derived.

Plato (ca. 427–347 B.C.) First a disciple of Socrates, came under the influence of the Pythagoreans, and postulated the existence of an abstract world of forms or ideas that, when manifested in matter, make up the objects in the empirical world. The only true knowledge is that of the forms, a knowledge that can be gained only by reflecting on the innate contents of the soul. Sensory experience interferes with the attainment of knowledge and should be avoided.

Protagoras (ca. 485–410 B.C.) A Sophist who taught that "Man is the measure of all things." In other words, what is considered true varies with a person's personal experiences; therefore, there is no objective truth, only individual versions of what is true.

Pythagoras (ca. 580–500 B.C.) Believed that an abstract world consisting of numbers and numerical relationships exerted an influence on the physical world. He created a dualistic view of humans by saying that in addition to our body, we have a mind (soul), which through reasoning could understand the abstract world of numbers. Furthermore, he believed the human soul to be immortal. Pythagoras' philosophy had a major influence on Plato and, through Christianity, on the entire Western world.

Rational soul According to Aristotle, the soul possessed only by humans. It incorporates the functions of the vegetative and sensitive souls and allows thinking about events in the empirical world (passive reason) and the abstraction of the concepts that characterize events in the empirical world (active reason).

Recall For Aristotle, the active mental search for the recollection of past experiences.

Reductionism The attempt to explain objects or events in one domain by using terminology, concepts, laws, or principles from another domain. Explaining observable phenomena (domain 1) in terms of atomic theory (domain 2) would be an example; explaining human behavior and cognition (domain 1) in terms of biochemical principles (domain 2) would be another. In a sense, it can be said that events in domain 1 are *reduced* to events in domain 2.

Remembering For Aristotle, the passive recollection of past experiences.

Reminiscence theory of knowledge Plato's belief that knowledge is attained by remembering the experiences the soul had when it dwelled among the forms before entering the body.

Scala naturae Aristotle's description of nature as being arranged in a hierarchy from formless matter to the unmoved mover. In this grand design, the only thing higher than humans was the unmoved mover.

Sensitive soul According to Aristotle, the soul possessed by animals. It includes the functions provided by the vegetative soul and provides the ability to interact with the environment and to retain the information gained from that interaction.

Socrates (ca. 470–399 B.C.) Disagreed with the Sophists' contention that there is no discernible truth beyond individual opinion. Socrates believed that by examining a number of individual manifestations of a concept, the general concept itself could be defined clearly and precisely. These general definitions are stable and knowable and, when known, generate moral behavior.

Solipsism The belief that a person's subjective reality is the only reality that exists and can be known.

Sophists A group of philosopher-teachers who believed that "truth" was what people thought it to be. To convince others that something is true, one needs effective communication skills, and it was those skills that the Sophists taught.

Teleology The belief that nature is purposive. Aristotle's philosophy was teleological.

Temple medicine The type of medicine practiced by priests in early Greek temples that was characterized by superstition and magic. Individuals such as Alcmaeon and Hippocrates severely criticized temple medicine and were instrumental in displacing such practices with naturalistic medicine—that is, medicine that sought natural causes of disorders rather than supernatural causes.

Thales (ca. 625–547 B.C.) Often called the first philosopher because he emphasized natural instead of supernatural explanations of things. By encouraging the critical evaluation of his ideas and those of others, he is thought to have started the Golden Age of Greek philosophy. He believed water to be the primary element from which everything else was derived.

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Theory of forms Plato's contention that ultimate reality consists of abstract ideas or forms that correspond to all objects in the empirical world. Knowledge of these abstractions is innate and can be attained only through introspection.

Theory of mind An area in cognitive development that concerns how we come to know the beliefs, feelings, plans, and behavioral intentions of other people.

Transmigration of the soul The Dionysiac-Orphic belief that because of some transgression, the soul is compelled to dwell in one earthly prison after another until it is purified. The transmigration may find the soul at various times in plants, animals, and humans as it seeks redemption.

Unmoved mover According to Aristotle, that which gave nature its purpose, or final cause, but was itself uncaused. In Aristotle's philosophy, the unmoved mover was a logical necessity.

Vegetative soul The soul possessed by plants. It allows only growth, the intake of nutrition, and reproduction.

Xenophanes (ca. 560–478 B.C.) Believed people created gods in their own image. He noted that dark-skinned people created dark-skinned gods and light-skinned people created light-skinned gods. He speculated that the gods created by nonhuman animals would have the characteristics of those animals. He postulated the existence of one all-powerful god without human characteristics but warned that all beliefs are suspect, even his own.

Zeno of Elea (ca. 495–430 B.C.) A disciple of Parmenedes known for his clever examples and fables (see **Zeno's Paradox**).

Zeno's paradox The assertion that in order for an object to pass from point A to point B, it must first traverse half the distance between those two points, and then half of the remaining distance, and so forth. Because this process must occur an infinite number of times, Zeno concluded that an object could logically never reach point B.

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3

Rome and the Middle Ages

Shortly after Aristotle's death (322 B.C.), the Romans invaded Greek territory. In this time of great personal strife, complex and abstract philosophies were of little comfort. A more worldly philosophy was needed—a philosophy that addressed the problems of everyday living. The major questions were no longer, What is the nature of physical reality? or What and how can humans know? but rather, How is it best to live? or What is the nature of the good life? or What is worth believing in? What emerged in response to the latter questions were the philosophies of the Skeptics, Cynics, Epicureans, Stoics, and, finally, the Christians.

AFTER ARISTOTLE

Both Skepticism and Cynicism were critical of other philosophies, contending that they were either completely false or irrelevant to human needs. As a solution, Skepticism promoted a suspension of belief in anything, and Cynicism promoted a retreat from society. In turn, Epicureanism was a response to the Skeptics' and Cynics' claims, and spoke directly to the moral conduct of humans.

Skepticism

Pyrrho of Elis (ca. 360–270 B.C.) is usually considered the founder of the school of **Skepticism**, although Skeptics had much in common with the earlier Sophists. There are no extant writings of Pyrrho, and most of what is known of his ideas comes from his disciple Sextus Empiricus, who wrote *Outlines of Pyrrhonism* (Bury, 1990) in the third century A.D.

The Skeptics' main target of attack was dogmatism. Sextus Empiricus, who was a physician as well as a Skeptic, saw dogmatism as a form of disease that needed to be cured. For the Skeptics, a **dogmatist** was anyone claiming to have arrived at an indisputable truth. The Skeptics believed that the arguments for and against many philosophical positions were equally compelling. Because all claims of truth appeared equivocal, the Skeptics advocated a suspension of judgment. However, they were not dogmatic in even this belief, that is, they were not denying any other philosophy; they were only claiming to be unaware of any reliable criteria for distinguishing among various claims of truth. They held "that no one at all could know anything at all; and with commendable consistency they proceeded to deny that they themselves knew even that distressing fact" (Barnes, 1982, p. 136).

The Skeptics noted that because no matter what one believed it could turn out to be false, one could avoid the problems of being wrong by simply not believing in anything. By refraining from making judgments about things that could not truly be understood, the Skeptics sought a life of "quietude," "tranquility," or "imperturbability." It was the dogmatists who fought among themselves and lived lives of agitation. So if "truth" did not guide the lives of the Skeptics, what did? They had two primary principles: appearances and convention. By *appearances*, the Skeptics meant simple sensations and feelings. By *convention*, they meant the traditions, laws, and customs of society. They acknowledged that various substances tasted sweet or bitter, for example, but the essence of "sweetness" or "bitterness" was beyond their comprehension and thus their concern. They acknowledged that various actions brought pleasure or pain, but concepts of moral goodness or badness were beyond their grasp. In general, appearances (basic sensations and emotions) were acceptable as guides for living, but judgments or interpretations of appearances were not. Their willingness to live in accordance with societal conventions was an extension of their commonsense philosophy.

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Conventions that the Skeptics were willing to accept included "Instruction of the Arts" (Bury, 1990; Hankinson, 1995). Here, *arts* refers to the trades and professions available for economic survival within a culture. However, for the Skeptic, work was work and he or she sought in it no ultimate meaning or purpose. Interestingly, the early Christians were able to use the widespread Skepticism of the Roman world to their advantage: "If the philosopher says that nothing is true or false and that there are not reliable standards of judging, then why not accept Christian revelation and why not revert to faith and custom as the sources of inspiration?" (Kurtz, 1992, p. 41). The theme of doubt concerning the universal truths exemplified by the Sophists and Skeptics will manifest itself again in romanticism (see Chapter 7).

Cynicism

Antisthenes (ca. 445–365 B.C.) studied with the Sophist Gorgias and later became a companion of Socrates. According to Plato, Antisthenes was present at Socrates' death. At some point, however, Antisthenes completely lost faith in philosophy and renounced his comfortable upper-class life. He believed that society, with its emphasis on material goods, status, and employment, was a distortion of nature and should be avoided. Showing a kinship to both the Sophists and Skeptics, Antisthenes questioned the value of intellectual pursuits, saying, for example, "A horse I can see, but horsehood I cannot see" (Esper, 1964, p. 133). Antisthenes preached a back-to-nature philosophy that involved a life free from wants, passions, and the many conventions of society. He thought that true happiness depended on self-sufficiency. It was the quest for the simple, independent, natural life that characterized

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Cynicism. The following is an account of the type of existence that Antisthenes lived after he renounced his aristocratic life:

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The considerable fame of Antisthenes was exceeded by his disciple **Diogenes (ca. 412–323 B.C.)**, the son of a disreputable moneychanger who had been sent to prison for defacing money. Diogenes decided to outdo his father by defacing the "currency" of the world. Conventional labels such as *king*, *general*, *honor*, *wisdom*, and *happiness* were social currencies that needed to be exposed—that is, defaced. In his personal life, Diogenes rejected conventional religion, manners, housing, food, and fashion. He lived by begging and proclaimed his brotherhood with not only all humans but also animals. It is said that Alexander the Great once visited him and asked if he could do him any favor; "Only to stand out of my light" was his answer. Legend also has it that Alexander was so impressed by Diogenes' self-sufficiency and shamelessness that he said, "Had I not been Alexander, I would have liked to be Diogenes" (Branham, 1996, p. 88). Interestingly, Diogenes is reputed to have died in Corinth on June 13, 323 B.C., the same day that Alexander died in Babylon (Long, 1996).

Because Diogenes lived an extremely primitive life, he was given the nickname Cynic, which literally means "doglike" (Branham & Goulet-Cazé, 1996). In fact, the Cynics argued that nonhuman animals provide the best model for human conduct. First, all the needs of nonhuman animals are natural and, therefore, the satisfaction of those needs is straightforward. Second, nonhuman animals do not have religion.

> To Diogenes and his disciples religion seemed to be an obstacle to human happiness, which is why the Cynics considered the state of an irrational creature far preferable to that of men, who suffer the misfortune of having a concept of the gods. (Goulet-Cazé, 1996, p. 64)

Clearly, the primary message of the Cynics was that nature, not social conventions, should guide human behavior. Social conventions are human inventions, and living in accordance with them causes shame, guilt, hypocrisy, greed, envy, and hate, among other things. Therefore, "the Cynic rejects the family and all the distinctions based on sex, birth, rank, race, or education" (Moles, 1996, p. 116). Also, making sacrifices for others, patriotism, and devotion to a common cause were considered by the Cynics as just plain foolish. Besides individualism, the Cynics typically advocated free love and viewed themselves as citizens of the world rather than of any particular country.

To make his point that "nothing natural can be bad," Diogenes often engaged in what was considered outrageous behavior, "farting loudly in crowded places; urinating, masturbating, or defecating in sight of all" (Krueger, 1996, p. 222). About his habit of masturbating in public, Diogenes said, "I only wish I could be rid of hunger by rubbing my belly" (Branham, 1996, p. 98). Of course, Diogenes rejected the conventional distinction his audience was making between acceptable "private" and "public" activities. Instead, he was demonstrating his belief that "natural desires are best satisfied in the easiest, most practical, and cheapest way possible" (Branham, 1996, p. 89). Again, by rejecting bodily control, Diogenes was rejecting social control (Krueger, 1996).

Cynicism became a consistent theme in the history of philosophy. During the time of the Roman Empire, reactions to the character of Diogenes were ambivalent: "Pagans and Christians

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alike praised Diogenes for his life of voluntary poverty and condemned him for obscenity" (Krueger, 1996, p. 225). We will see later manifestations of Cynicism in the philosophies of Rousseau and Nietzsche (see Chapter 7) and in humanistic psychology (see Chapter 18).

Epicureanism

Epicurus of Samos (ca. 341–270 B.C.) based his philosophy on Democritus's atomism but rejected his determinism. According to Epicurus, the atoms making up humans never lose their ability to move freely; hence, he postulated free will. It is important to realize, however, that it was the nature of atoms and atomic activity that gave humans their freedom, not a disembodied soul. Like Democritus, the Epicureans were materialists, believing that "the universe is eminently physical, and that includes the soul of man" (O'Connor, 1993, p. 11). Epicurus also agreed with Democritus that there was no afterlife because the soul was made up of freely moving atoms that scattered upon death. Atoms were never created or destroyed; they were only rearranged. It followed that the atoms constituting an individual would become part of another configuration following the individual's death. However, it was assumed that nothing was retained or transferred from one configuration to another. In this way, Epicurus freed humans from one of their major concerns: What is life like after death, and how should one prepare for it? The good life must be attained in this world, for there is no other. In general, Epicurus believed that postulating supernatural influences in nature was a source of terror for most people and that the idea of immortality destroyed the only hope most people had for finally escaping pain.

Epicurus did believe in the Olympian gods, but he thought that they did not concern themselves with the world or with human affairs. The Epicureans preferred naturalistic explanations to supernatural ones, and they strongly protested against magic, astrology, and divination. It was this disbelief in supernatural influences that led Epicurus's passionate disciple Lucretius (ca. 99–55 B.C.) to proudly refer to Epicurus as a "destroyer of religion." In his book *On the Nature of Things*, Lucretius lamented what he considered the superficial religious practices of his day:

> [It is not] piety *for a man* to be seen, *with his head* veiled, turning towards a stone, and drawing near to every altar; or to fall prostrate on the ground, and to stretch out his hands before the shrines of the gods; or to sprinkle the altars with copious blood of four-footed *beasts*, and to add vows to vows; but *it is* rather *piety* to be able to contemplate all things with a serene mind. (J. S. Watson, 1997, p. 236)

Epicurus and his followers lived simple lives. For example, their food and drink consisted mainly of bread and water, which was all right with Epicurus: "I am thrilled with pleasure in the body when I live on bread and water, and I spit on luxurious pleasures, not for their own sake, but because of the inconveniences that follow them" (Russell, 1945, p. 242). Intense pleasure was to be avoided because it was often followed by pain (such

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Epicurus

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as indigestion or hangover following eating or drinking too much) and because such uncommon pleasure would make everyday experiences less pleasing by contrast. Thus, the type of **hedonism** (seeking pleasure and avoiding pain) prescribed by Epicurus ironically emphasized the pleasure that results from having one's basic needs satisfied simply. In this sense, the good life for the Epicurean consisted more from the absence of pain than the presence of intense pleasure. Likewise, Epicurus urged his followers to avoid power and fame because such things make others envious, and they may become enemies. Wise individuals attempt to live their lives unnoticed (O'Connor, 1993). Concerning sexual intercourse, Epicurus said,

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For Epicurus, the highest form of social pleasure was friendship.

We see then that, according to Epicurus, the goal of life was individual happiness, but his notion of happiness was not simple hedonism. He was more interested in a person's long-term happiness, which could be attained only by avoiding extremes. Extreme pleasures are short-lived and ultimately result in pain or frustration; thus, humans should strive for the tranquility that comes from a balance between the lack of and an excess of a thing. Therefore, humans cannot simply follow their impulses to attain the good life; reason and choice must be exercised in order to provide a balanced life, which in turn provides the greatest amount of pleasure over the longest period of time. For Epicurus, the good life was free, simple, rational, and moderate.

PHILOSOPHY IN ROME

Epicureanism survived with diminishing influence for 600 years after the death of Epicurus. It is one of many traditions originating with the Greeks that could be found in the Roman Empire. Although they are often placed together as the "Ancient World," the Greeks and Romans differed in many significant ways. Where the Greeks valued philosophy and science for its own sake, the Romans were fiercely pragmatic. Where the Greeks championed debate and even the chaos of democracy, the Romans sought law and order. Philosophy and science were useful to the extent that they provided service to the Empire. Roman physicians had value because they helped soldiers remain in the field; architects and engineers flourished through their magnificent buildings and major network of roads; great writers were taught for their style with language; but even such philosophers as Plato and Aristotle eventually proved of limited use. Or as the Stoic emperor Marcus Aurelius would say: "What is no good for the hive, is no good for the bee" (Staniforth, 1964, p. 104).

At the height of its influence, the Roman Empire included the entire Western world, from the Near East and North Africa to the British Isles. As has been quipped, "The Ancient Greeks were the creators and founders of Western Civilization, and the Romans were its builders" (Prioreschi, 1998, p. 1). One Greek philosophy came to be associated with the pragmatic Romans, under whom it matured and flourished—Stoicism.

Stoicism

Because **Zeno of Citium (ca. 335–263 B.C.)** taught in a school that had a *stoa poikile*, or a painted porch, his philosophy came to be known as Stoicism. Zeno believed that the world was ruled by a divine plan and that everything in nature, including humans, was there for a reason. The Stoics believed that to live in accordance with nature was the ultimate virtue. The most important derivative of this "divine plan" theory was the belief that whatever happens, happens for a reason; there are no accidents; and all must simply be accepted as part of the plan. The good life involved accepting one's fate with indifference, even if suffering was involved. Indeed, courage in the face of suffering or danger was considered most admirable. You must die, but you need not die groaning; you must be imprisoned, but you need not whine; you must suffer exile, but you can do so with courage and at peace. Your body can be

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chained, but not your will. In short, a Stoic is a person who may be sick, in pain, in peril, dying, in exile, or disgraced but is still content:

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In the Roman Empire, **Stoicism** won out over **Epicureanism**, because Stoicism was compatible with the Roman emphasis on law and order. The widespread appeal of Stoicism can be seen in the fact that it was embraced by Seneca (ca. 4 B.C.–A.D. 65), a philosopher; Epictetus (ca. A.D. 55–135), a slave; and **Marcus Aurelius** (A.D. 121–180), an emperor. As long as the Roman government provided basic amenities, Stoicism remained the accepted philosophy.

The Stoics did not overly value material possessions because they could be lost or taken away. Virtue alone was important. Good Romans were expected to accept their stations in life and perform their duties without question. As Marcus Aurelius wrote in his *Meditations* "Work yourself hard…. Desire one thing alone: that your actions or inactions alike should be worthy of a reasoning citizen" (Staniforth, 1964, p. 141). The joy in life came in knowing that one was participating in a grander plan, even if that plan was incomprehensible to the common individual.

The only personal freedom was in choosing whether to act in accordance with nature's master plan. When the individual's will was compatible with natural law and order, the individual was virtuous. When a person sought enviously or ambitiously to defy the fate assigned them, the individual was immoral. As Marcus Aurelius advised, "Love nothing but that which comes woven to you in the pattern of your destiny" (Staniforth, 1964, p. 115).

The essence of Stoic philosophy then is seen in a final quote from Marcus Aurelius' *Meditations*. "To live each day as though one's last, never flustered, never apathetic, never attitudinizing—here is the perfection of character" (Staniforth, 1964, p.118). The Stoics did not solve the problem of how the human will can be free in a completely determined universe. The same problem reemerges within Christianity because an all-knowing, all-powerful God is postulated along with the human ability to choose between good and evil. In fact, both the Stoics and the Christians had trouble explaining the existence of evil and sinners. If everything in the universe was planned by a beneficent providence, what accounts for evil?

As the Roman Empire began to fall to governmental corruption, environmental mismanagement, and barbarian invasions, the people sought a new definition of the good life, one that would provide comfort and hope in perilous times. It was time to look toward the heavens for help. Before we turn to the Christian alternative, however, let's look briefly at another philosophy that became part of Christian thought.

Neoplatonism

Besides Stoicism and Epicureanism, a renewed interest in Plato's philosophy appeared early on in Rome. Such **neoplatonism**, however, stressed the most mystical aspects of Plato's philosophy over its rational aspects. One brand of Neoplatonism combined Platonic philosophy with Judaism and, in so doing, created two things lacking in the prevailing religions and philosophies of the day—a concern with individual immortality and human passion.

> In spite of the lofty aspirations of Plato and the equally lofty resignation of the Stoic, the literature of the West lacked something [and] no Greek could have named the deficiency…. It required a temper of a different make; it required a people whose God was jealous and whose faith was a flaming fire; in a word, the Greek had thought about himself until he was indifferent to all things and desperately skeptical; the Hebrew had still the fire of passion and the impetuosity of faith; with these he made life interesting and fused in one molten mass the attractive elements of every known doctrine. The result was preeminently unintelligible, but it was inspired. The strength of the new influence lay exactly in that strange fervour which must have

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> seemed to the Greek a form of madness. (Brett, 1912–1921/1965, p. 171)

Philo. Nicknamed the Jewish Plato, **Philo (ca. 25 B.C.–A.D. 50)** took the Biblical account of the creation of man as the starting point of his philosophy. From that account, we learn that the human body was created from the earth but that the human soul was part of God himself: "Then the Lord God formed man of dust from the ground, and breathed into his nostrils the breath of life; and man became a living being" (Genesis 2:7). Thus, humans have a dual nature: The body is lowly and despicable, and the soul is a fragment of the divine being or, at least, a ray of divine light. The life of an individual human can develop in one of two directions: downward, away from the inner light and toward the experiences of the flesh; or upward, away from experiences of the flesh and toward the inner light. Philo, like the Pythagoreans and Plato before him, condemned sensory experience because it could not provide knowledge. To this, however, Philo added the belief that sensory experience should be condemned because such experience interferes with a direct understanding of and communication with God.

According to Philo, all knowledge comes from God. To receive God's wisdom, however, the soul (mind) must be purified. That is, the mind must be made free of all sensory distractions. Real knowledge can be attained only by divine illumination: humans by themselves know nothing, nor can they ever know anything. God alone has knowledge, and he alone can impart that knowledge.

For Philo, knowledge came from a direct, personal relationship with God. Philo described his own experience of receiving the word of God:

> Sometimes when I come to my work empty, I have suddenly become full, ideas being in an invisible manner showered upon me and implanted in me from on high; so that through the influence of Divine Inspiration I have become greatly excited, and have known neither the place in which I was nor those who were present, nor myself, nor what I was saying, nor what I was writing; for then I have been conscious of a richness of interpretation and enjoyment of light, a most penetrating sight, a most manifest energy in all that was to be done, having such an effect on my mind as the clearest ocular demonstration would have on the eyes. (Brett, 1912–1921/1965, p. 178)

This statement represented a new view of knowledge, one that would have been foreign to the Greeks. Rather than knowledge being sought rationally, it was revealed by God, but only to souls that were prepared to receive it—that is, to souls that had purged themselves of all influences of the flesh. Again, humans can know only what God provides. Thus, to the Pythagorean-Platonic mistrust and dislike of sensory information and the glorification of rationality, Philo added the belief that the soul (mind) is the breath of God within humans and is the means by which God makes himself and his wisdom known to man.

Brett (1912–1921/1965) made the following important observation regarding the philosophy of Philo and all the subsequent philosophies and religions that emphasized the importance of intense, inner experience:

> Psychology is lived as well as described; personal experiences go to make its history; to the mind that will strive and believe new worlds may be opened up, and if we find little enough in these writers on the senses or attention or such subjects, they are a mine of information on the life of the spirit.… A history of psychology is a history of two distinct things: first, the observation made by men upon one another; secondly, the observations which now and again the more powerful minds are able to make upon themselves. For many a long century after Philo we shall have to record the progress of psychology in both senses. It would be unwise to begin with any prejudices against those subjective data which are incapable of

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> proof; they may seem at last to be the axioms of all psychology. (p. 171)

It would pay to keep Brett's comments regarding the importance of subjective data in mind while reading the remainder of this chapter, if not for the remainder of the book.

Plotinus. **Plotinus (ca. 205–270)**, like Philo, found refuge from a world of woe in the spiritual world:

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Because Plotinus always diverted attention away from his personal life and toward his philosophy, few of the details of his life are known. Only one fact was confided to his close friends: "That his infantile compulsion to suck his nurse's breast continued till the age of eight, finally surrendering to ridicule" (Gregory, 1991, p. 3).

Plotinus arranged all things into a hierarchy, at the top of which was the One, or God. The One was supreme and unknowable. Next in the hierarchy was the Spirit, which was the image of the One. It was the Spirit that was part of every human soul, and it was by reflecting on it that we could come close to knowing the One. The third and lowest member of the hierarchy was the Soul. Although the Soul was inferior to the One and to the Spirit, it was the cause of all things that existed in the physical world. From the One emanated the Spirit, and from the Spirit emanated the Soul, and from the Soul emanated nature. When the Soul entered something material, like a body, it attempted to create a copy of the Spirit, which was a copy of the One. Because the One was reflected in Spirit, the Spirit was reflected in the Soul, and the Soul created the physical world, the unknowable One was very much a part of nature. Although Plotinus was generally in agreement with Plato's philosophy, he did not share Plato's low opinion of sensory experience. Rather, he believed that the sensible world was beautiful, and he gave art, music, and attractive humans as examples. It was not that the sensible world was evil; it was simply less perfect than the spiritual world.

Even though Plotinus's philosophy was more congenial to sensory information than was Platonism, Plotinus still concluded that the physical world was an inferior copy of the divine realm. He also followed Plato in believing that when the soul entered the body, it merged with something inferior to itself, and thus the truth that it contained was obscured. We must aspire to learn about the world beyond the physical world, the abstract world from which the physical world was derived. It is only in the world beyond the physical world that things are eternal, immutable, and in a state of bliss.

The step from Neoplatonism to early Christianity was not a large one. To the Christian, the Other World of the Neoplatonists became the kingdom of God to be enjoyed after death. There was to be an important revision in Plotinus's philosophy, however:

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Like Plato and all other Neoplatonists, Plotinus saw the body as the soul's prison. Through intense meditation, the soul could be released from the body and dwell among the eternal and the changeless. Plotinus believed that all humans were capable of such transcendental experiences and encouraged them to have them because no other experience was more important or satisfying. To the Stoic's definition of the good life as quiet acceptance of one's fate and the Epicurean's avoidance of pain, we can now add a third suggestion—the turning away from the empirical world in order to enter a union with those eternal things that dwell beyond the world of flesh. Plotinus's theory was not itself Christian, but it strongly influenced subsequent Christian thought.

EMPHASIS ON SPIRIT

The Roman Empire began when Augustus became emperor in 27 B.C., and it lasted for more than 400 years. In 410, the "eternal city" of Rome was sacked by the Visigoths, and shortly thereafter almost all of the empire was under Germanic

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control. On September 4, 476, the last Roman emperor—Romulus Augustulus—was disposed by Odoacer, leader of the German invaders. It has become traditional to date the fall of the Roman Empire to 476, although it had been in serious decline for many years prior to that date, and of course in some sense endures even today.

The imperial expansion of the Roman Empire, and then its collapse, brought a number of influences to bear on Roman culture. One such influence came from the religions of India and Persia. Indian **Vedantism**, for example, taught that perfection could be approximated by entering into semiecstatic trances. Another example is **Zoroastrianism**, which taught that individuals are caught in an eternal struggle between wisdom and correctness on one hand and ignorance and evil on the other. All good things were thought to derive from the brilliant, divine sun and all bad things from darkness. Also influential were a number of ancient **mystery religions** that entered the Greek and Roman worlds primarily from the Near East. Three examples are the cults of Magna Mater (Great Mother), Isis, and Mithras (Angus, 1975). The mystery religions had several things in common: secret rites of initiation, ceremonies (such as some form of sacrifice) designed to bring initiates into communion with the patron deity or deities, an emphasis on death and rebirth, rituals providing purification and forgiveness of sins (such as confession and baptism in holy water), sacramental dramas providing initiates the exaltation of a new life, and the providing of a feeling of community among believers. Clearly, there was much in common between the mystery religions and early Christianity. Incidentally, the popular god Mithras was said to have been born on December 25 in the presence of shepherds.

Another influence on Roman thought was Judaism. The Jews believed in one supreme god who, unlike the rather indifferent Olympian and Roman gods, was concerned with the conduct of individual humans. The Jews also had a strict moral code, and if an individual's conduct was in accordance with this code, God rewarded the person; if it was not, God punished the person. Thus, individuals were responsible for their transgressions. It was from this mixture of many influences that Christianity first emerged as another religion in the Roman Empire.

Jesus

Although many of the details of his life are subject to debate (for example, his connection with the Essenes), the Christian religion is centered around **Jesus (ca. 6 B.C.–A.D. 30)**. Jesus taught, among other things, that knowledge of good and evil is revealed by God and that, once revealed, such knowledge should guide human conduct. But Jesus himself was not a philosopher; he was a simple man with focused goals:

> Jesus himself had no speculative interest, his concern being primarily with the religious development of the individual. In his attitude to the learned he typified the practical man of simple faith and intuitive insight who trusts experience rather than a book and his heart rather than his head. He knew intuitively what to expect from people and the influences which shape their development of character. A brilliant diagnostician and curer of souls, he had little interest in formalizing or systematizing his assumptions. (Brett, 1912–1921/1965, pp. 143–144)

None of those who formalized Jesus' teachings ever met him. How much of Jesus' original intent survived the various attempts to formalize his ideas is still a matter of speculation. In any case, those who claimed that Jesus was the son of God came to be called Christians. But before it was to become a dominant force in the Western world, Christianity needed a philosophical basis, and this was provided to a large extent by Plato's philosophy. The early Christian church is best thought of as a blending of the Judeo-Christian tradition with Platonism or, more accurately, with Neoplatonism. This blending occurred gradually and reached its peak with Augustine (discussed later). As the blending of the Judeo-Christian tradition and the Platonic philosophy proceeded, a major shift in emphasis occurred from the rational (emphasized by Greek philosophy) to the spiritual (emphasized in the Judeo-Christian tradition).

St. Paul

The many influences converging on early Christianity are nicely illustrated in the work of **St. Paul (ca. A.D.10–64**). While on the road to Damascus, Paul is said to have had a vision that Jesus was the Messiah foretold by Hebrew prophets. Upon this vision, Saul of Tarsus was converted to Paul, Jesus became the Christ, and Christianity was born. Paul was a Roman citizen whose education involved both Judaic teachings and Greek philosophy. From Judaic tradition, he learned that there was one god who created the universe and shapes the destiny of humans. God is omniscient (knows everything), omnipresent (is everywhere), and omnipotent (has unlimited power). Humans fell from a state of grace in the Garden of Eden, and they have been seeking atonement ever since for this original sin. To these beliefs, Paul added the idea that God had sacrificed his son to atone for our shared transgression—that is, original sin. This sacrifice made a personal reunion with God possible. In a sense, each individual was now able to start life with a clean slate: "For as in Adam all die so also in Christ shall all be made alive" (I Corinthians 15:22). Acceptance of Christ as the savior was the only means of redemption.

In his training in Greek philosophy, St. Paul was especially influenced by Plato. Paul took Plato's notion that true knowledge can be attained only by escaping from the influence of sensory information and transformed it into a battle between the soul, which contains the spark of God, and the desires of the flesh. But then he did something that most Greek sophists would have found abhorrent: He placed faith above reason. Faith alone can provide personal salvation. The good life is no longer defined in terms of rationality but in terms of our willingness to surrender our existence to God's will. God is the cause of everything, knows everything, and has a plan for everything. By believing—by having faith—we affiliate ourselves with God and receive his grace. By living a life in accordance with God's will, we are granted the privilege of spending eternity in God's grace when our mortal coil is shed. For many, given their earthly conditions, this seemed to be a small price to pay for eternal bliss.

Paul's efforts left major questions for future theologians to answer. Given the fact that God is all knowing and all powerful, is there room for human free will? And given the importance of faith for salvation, what is the function or value of human reason? There was also a third question: Given the fact that God is perfect and loving, what accounts for the evil in the world?

Akin to some Greek traditions, the human was now clearly composed of three parts: the body, the mind, and the spirit. As it was for the Pythagoreans, Platonists, and Neoplatonists, the body was the major source of difficulty for early Christians. The spirit was the spark of God within us and was the most highly valued aspect of human nature. Through our spirit, we were capable of becoming close to God, and the spirit was viewed as immortal. The mind, the rational part of humans, was seen as caught between the body and the spirit—sometimes serving the body, which is bad, and at other times serving the spirit, which is good.

Akin to some Judaic traditions, then, humans are caught in an eternal struggle between sinful, bodily urges and God's law. The law can be understood and accepted and a desire can exist to act in accordance with it, but often the passions of the body conflict with the law, and they win the struggle. To know what is moral does not guarantee moral behavior. This perpetual struggle results from the fact that humans are animals who possess a spark of God. We are partly animalistic and partly divine; conflict is the necessary consequence. For Paul, all physical pleasure was sinful, but most sinful of all was sexual pleasure. This state of conflict involving the good, the bad, and the rational is very much like the one described by Freud many centuries later.

Paul's Attitude toward Women. It is often said that Paul was guilty of misogyny (hatred of women), but it may be of value here to distinguish between Paul and Pauline writings. That is, as

Biblical scholarship has evolved, not all of the New Testament material once attributed to Paul (such as the book of Hebrews) is now believed to have literally been penned by his hand. In the same way that many later physicians wrote in the style of Hippocrates, it is likely that other early Christians wrote in the style of Paul.

In any event, Pauline writing is critical of sex. Paul glorified celibacy and only reluctantly sanctioned sex even within marriage: "It is a good thing for a man to have nothing to do with women; but because there is so much immorality, let each man have his own wife and each woman her own husband" (1 Corinthians 7:1–3). However, this negative attitude went beyond sex. Consider also,

> Let a woman learn in silence and with all submissiveness. I permit no woman to teach or to have authority over men; she is to keep silent. For Adam was formed first, then Eve; and Adam was not deceived, but the woman was deceived and became a transgressor. (1 Timothy 1:11–14)

And elsewhere Paul said:

> As in all the churches of the saints, the women should keep silent in the churches. For they are not permitted to speak, but should be subordinate, as even the law says. If there is anything they desire to know, let them ask their husbands at home. For it is shameful for a woman to speak in church. (1 Corinthians 14:34–35)

On the other hand, there are elements of gender equality in Pauline writing. For example, in Galatians 3:28, "There are no such things as a Jew and Greek, slave and freeman, male and female; for you are all one person in Christ Jesus." In any case, insofar as Paul believed women were socially and intellectually inferior to men, he was reflecting a belief that was prevalent in Roman culture (Balsdon, 1962).

In the 300 years following the death of Jesus, there was a gradual increase in the acceptance of Christianity within the Roman Empire. Following the Pauline doctrine, Christians aspired to a simple, pure life and a poverty of material things. Concerning the latter, "it has been argued that the Cynics provided an important pagan model for early Christian communities" (Branham & Goulet-Cazé, 1996, p. 19), and many comparisons between Christianity and Stoicism can be found.

As Christianity became increasingly sophisticated, many debates occurred within the church concerning what was true Christian belief and what was heretical. We will sample these debates shortly. Outside the church, pagans (originally the term *pagan* meant "peasant" but came to mean "non-Christian") tended to view Christians as atheists, magicians, and nonconformists (Benko, 1984; Wilkins, 2003). As the number of Christians increased, their nonconformity was viewed as a threat by some Roman emperors, and they were sometimes severely persecuted. The first 300 years of Christianity were anything but tranquil.

Emperor Constantine

In 312, the emperor **Constantine (ca. 272–337)** was said to have had a vision that changed the course of Christian history. Supposedly, just before the Battle of the Milvian Bridge, he visualized the Christian cross in the sky accompanied by the words, "By this sign you shall conquer." Kousoulas (1997) provides evidence that Constantine actually had no vision but invented it to inspire his troops. In any case, he instructed his soldiers to mark their shields with an abbreviation, in Greek, of the word "Christ," and the next day, although his troops were greatly outnumbered, they won the battle decisively. Constantine attributed his victory to the god of the Christians and, thereafter, concerned himself with Christian affairs. In 313, Constantine signed the Edict of Milan, making Christianity an accepted religion in the Roman Empire. It should be emphasized that the Edict of Milan *did not* make Christianity the official religion of the Roman Empire, as is often claimed. Although Constantine clearly came to favor the Christian religion, the purpose of his Edict was to promote religious tolerance within the empire, and he never varied from that position. It was Theodosius I (emperor 379–395) who made Christianity the official religion of the Roman Empire.

In Constantine's time, there were several conflicting versions of Christianity, and this was bothersome to his Roman sense of order. For example, there was debate concerning the nature of Jesus: Was God the Father superior to Jesus the Son, did they have equal status, or was Jesus simply an exceptional individual? To decide the matter, Constantine convened at Nicaea, in 325, a meeting of bishops from throughout the Roman Empire. The Nicaean Council concluded after much bitter debate that God the Father and Jesus the Son had equal status. Thereafter, it was heresy to suggest otherwise. Also, in Constantine's time there was no universally accepted set of documents concerning the life and teachings of Jesus. Rather, different Christian communities used different documents to define their faith. For example, in addition to the four gospels that eventually became part of the New Testament, there were many that did not. It's not possible to know with certainty how many gospels there were, but around 30 noncanonical Gospels still survive. At the time, the various Christian communities had no uniformity as to which of these gospels were considered "Scripture." This too was unacceptable to Constantine, and he charged the bishops with the task of arriving at a single set of documents to be used by all Christian communities. Thus was created the "Constantine Bible," which, unfortunately, is lost to history, so its exact contents are unknown. So what is the origin of the New Testament as we know it today? In fact, it wasn't until 367 that Athanasius (296–373), the controversial and influential bishop of Alexandria, first decreed the 27 books that now constitute the New Testament and *only* those books be regarded as canonical. Although debate continued after Athanasius concerning which books should be included in the New Testament, his decree ultimately became orthodoxy.

In spite of his deep involvement in the affairs of the Christian church, Constantine continued to embrace a number of pagan beliefs, and it has often been argued that his sympathy toward Christianity was more a matter of political expediency (or Roman pragmatism) than religious conviction. The Edict of Milan reduced much social turmoil and significantly increased Constantine's power. Also, Constantine was baptized a Christian only on his deathbed, in 337. Scarre (1995) suggests the truth lies somewhere between true belief and political expediency: "There is certainly no reason to doubt that Constantine was a man of sincere religious conviction. But he was also an able propagandist, a gifted military commander, and an unscrupulous and determined manipulator" (p. 213). A good Roman, indeed.

Before Constantine, Christianity was very much a minority religion. It has been estimated that Christians constituted only about 5% of the population of the Roman Empire (Ehrman, 2002). However, after Constantine, and largely due to his efforts, a single set of beliefs and documents defined Christianity, and this helped promote its popularity. Christianity became widely known not only among common people but among intellectuals as well. This awareness by intellectuals caused the further questioning of Christian philosophy (e.g., Benko, 1984; Wilkins, 2003).

For example, once Christianity was an established religion, a debate ensued within the church concerning the status of non-Christian (pagan) beliefs and writings. This is well illustrated by the life of St. Jerome (ca. 347–420).

> Jerome tells us that while wracked with fever he was in spirit dragged before the judgment seat and asked who he was. "I am a Christian," he replied, but was told "Thou liest, thou art a follower of Cicero." Jerome was undoubtedly shaken by this experience, and we see in his later works a tension concerning the relationship between the sacred and the secular. As one often-cited quotation of Jerome's betrays "He who is educated and eloquent must not measure his saintliness merely by his fluency." (Henley & Thorne, 2005)

A gifted writer trained in the style of many famous "pagans," Jerome was concerned about the influence such works could hold over Christians.

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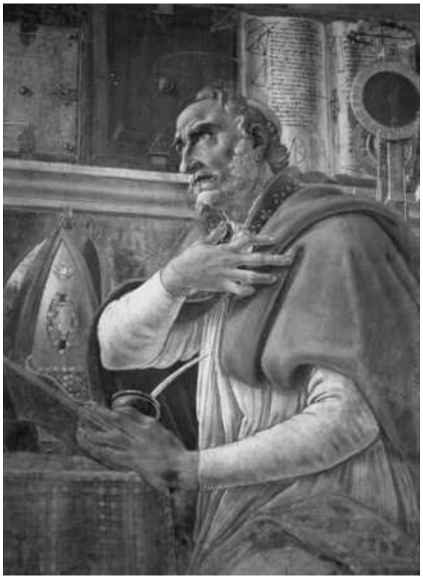
Similar ideas are found in the writings of **St. Augustine (ca. 354–430)** of Hippo (in North Africa). The authoritative, theological works of Augustine are often taken as marking the beginning of the Middle Ages, also called the medieval period of history (from the Latin *medius*, meaning "middle," and *aevium*, meaning "age").

St. Augustine

Augustine was a prolific writer, but his two most important works were *The City of God* and *The Confessions*. *The City of God* posits two worlds—or cities—one of man and one of God. Christians could immerse themselves in the man-made world of a failing Roman Empire, full of competing philosophies and earthly distractions, or they could align themselves with the city of God and keep focused on the theological. For Augustine, like Jerome, the question of drawing upon older (pagan) philosophies was one of motivations—that is, were you living those worldly philosophies, or using them toward a Christian end.

Augustine's Confessions. Augustine was instrumental in shifting the locus of control of human behavior from the outside (the city of man) to the inside (the city of God). For him, the acceptance of free will made personal responsibility meaningful. Because individuals are personally responsible for their actions, it is possible to praise or blame them, and people can feel good or bad about *themselves* depending on what choices they make. If people periodically chose evil over good, however, they need not feel guilty forever. By disclosing the actual or intended sin (as by confession), they are forgiven and again can pursue the pure, Christian life. In fact, Augustine's *Confessions* (written about 400) describes a long series of his own sins ranging from stealing for the sake of stealing to the sins of the flesh. The latter involved having at least two mistresses, one of whom bore him a child. When Augustine's mother decided it was time for him to marry, he was forced to abandon his mistress, an event that caused Augustine great anguish.



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St. Augustine

> My concubine being torn from my side as a hindrance to my marriage, my heart which clave unto her was torn and wounded and bleeding. [She left] vowing unto Thee never to know any other man, leaving with me my son by her. (Pusey, 1961, p. 94)

Augustine's marriage had to be delayed for two years because his bride-to-be was so young; however, he took another mistress in the meantime. Augustine was beginning to realize that he was a "wretched young man," and he prayed to God, "Give me chastity and continency, only not yet." His explanation to God for such a prayer was, "I feared lest Thou shouldest hear me too soon, and soon cure me of the disease of [lust], which I wished to have satisfied, rather than extinguished" (Pusey, 1961, p. 125). It was not until he was 32 that Augustine abandoned his carnal ways and converted to Christianity. Following his conversion, Augustine was consumed by the passion to know God, and the rest of his life was lived to that end.

The Christian ideology had wide appeal. To people suffering from hunger, plague, and war, a religion that focused on a more perfect, nonphysical world was comforting. To slaves and others with

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low status, a feeling of justice came from knowing that all humans were created in God's image. The poor were consoled by learning that material wealth was irrelevant to living the good life. Criminals did not need to remain criminals; they could be forgiven and were as likely as anyone to be granted salvation. All humans were part of a brotherhood; our origins were the same, as was our ultimate goal.

For Augustine, arrival at true knowledge requires the passage from an awareness of the body to sense perception, to an internal knowledge of the forms (universal ideas), and, finally, to an awareness of God, the author of the forms. For Augustine, as for the earlier Christians, ultimate knowledge consisted of knowing God. The human was seen as a dualistic being consisting of a body not unlike that possessed by animals and a spirit that was close to or part of God. The war between the two aspects of human nature, already present in Platonic philosophy, became the Christian struggle between heaven and hell—that is, between God and Satan.

The Will. God speaks to each individual through his or her soul, but the individual need not listen. According to Augustine, individuals are free to choose between the two worlds—the way of the flesh (Satan), which is sinful, or the way of God. The human ability to choose explains why evil exists: evil exists because people choose it. This, of course, raises the thorny question, Why did God give humans the ability to choose evil? For example, why did God allow the original sin to occur in the Garden of Eden? Concerning such questions, Augustine said, "We ought not try to understand more than should be understood" (Bourke, 1993, p. 241).

According to Augustine, people have an **internal sense** that helps them evaluate their experiences by providing an awareness of truth, error, personal obligation, and moral right. Deviation from this internal sense causes the feeling of guilt. In fact, one need not actually *act* contrary to this internal sense to feel guilty but only ponder doing so. Just thinking about doing something sinful will cause as much guilt as actually doing something sinful. All this results in behavior being controlled internally rather than externally. That is, instead of controlling behavior through externally administered rewards and punishments, it is controlled by personal feelings of virtue or guilt.

Does being baptized a Christian and consistently choosing good over evil grant a person access to heaven after his or her death? Not according to Augustine. Since the fall in the Garden of Eden, *all* humans have inherited original sin and are, therefore, worthy of eternal damnation. However, according to Augustine, certain people are, before they are born, chosen by God to eventually enter heaven. In other words, there is *nothing* people can do in their lifetime that allows them to eventually enter the kingdom of God. Entrance into heaven is determined by God's grace alone. The reason for God's choice concerning those who go to heaven (the elect) and those who do not is incomprehensible to humans and must forever remain a mystery. The fact that some humans are damned is only just because we are all worthy of damnation; the fact that some are granted salvation demonstrates God's mercy. Augustine's doctrine of **predestination** raised many questions that were never satisfactorily answered. For example, if salvation is a gift from God independent of one's actions, what prevents moral carelessness? (Chadwick, 2001).

In the centuries following Augustine's death, the doctrine of predestination was frequently debated by Christian theologians. In most cases, the doctrine was rejected in favor of the belief that *all* humans can earn salvation by accepting Christ as their savior and by avoiding sin during their lifetime. The theologies of Martin Luther (1483–1546) and John Calvin (1509–1564) are examples to the contrary. Both accepted Augustine's doctrine of predestination. We will elaborate Luther's thoughts on this matter in the next chapter. Interestingly, throughout the long history of this debate, both those supporting the doctrine and those opposing it use scripture to defend their positions.

Knowing God. For Augustine, it was not necessary to wait for the death of the body to know God; knowledge of God was attainable within an individual's lifetime. Before arriving at this conclusion,

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Augustine needed to find something about human experience of which he could be certain. He searched for something that could not be doubted and finally concluded that the fact that he doubted could not be doubted. In Book 20, Chapter 10, of *On the Trinity*, Augustine said,

> Whoever doubts that he himself lives, and remembers, and understands, and wills and thinks, and knows, and judges? Seeing that even if he doubts, he lives; if he doubts, he remembers why he doubts; if he doubts, he understands that he doubts; if he doubts, he wishes to be certain; if he doubts, he thinks; if he doubts, he knows that he does not know; if he doubts, he judges that he ought not to assert rashly. Whosoever therefore doubts about anything else, ought not to doubt of all these things; which if they were not, he would not be able to doubt of anything. (Hadden, 1912, pp. 133–134)

Thus, Augustine asserts the validity of inner, subjective experience. (As we will see in Chapter 4, Descartes used the same technique to arrive at his famous conclusion "I think, therefore I am"). The internal sense, not outer (sensory) experience, could be trusted. For Augustine then, a second way of knowing God (the first being the scriptures) was **introspection,** or the examination of one's inner experiences. We see here the influence of Plato, who also believed that truth must be attained through such introspective analysis. Augustinian introspection, however, became a means of achieving a personal communion with God (and in some ways anticipates the existentialism of Kierkegaard in Chapter 7). According to St. Augustine, the feeling of love that one experiences when one is contemplating God creates an ecstasy unsurpassed among human emotions. Such a feeling is the primary goal of human existence; anything that is compatible with achieving such a state of ecstasy is good, whereas anything that distracts from its achievement is bad. Faith and a personal, emotional union with God were, for Augustine, the most important ingredients of human existence. Reason, which had been supreme for the Greeks, became inferior not only to faith but also to human emotion. Reason remained in an inferior position throughout much of the Middle Age, during which time the writings of Augustine prevailed and provided a cornerstone of church dogma. Augustine had demonstrated that the human mind could know itself without confronting the empirical world. Because the Holy Spirit dwelled in this realm of pure thought, intense, highly emotional introspection was encouraged. Such introspection carried the individual farther away from the world of man.

Augustine's Analysis of the Experience of Time. Augustine's *Confessions* is an extended conversation with God in which he often asks God's help in solving the mysteries of human existence. One such mystery is the experience of time. God, he observed, has no sense of time because he lives in the eternal present. Mortals, however, have conceptions of the past, present, and future, and therein lies the mystery. We claim to measure how long in the past an event occurred, but past events no longer exist and therefore cannot be measured. We claim to measure how far in the future a forthcoming event is, but future events do not yet exist and therefore cannot be measured. Even the present, which is the fleeting moment between the past and the future, occurs too quickly to be measured. "We measure neither times to come, nor past, nor present, nor passing; and yet we do measure times" (Pusey, 1961, p. 203). It was clear to Augustine that the terms *past*, *present*, and *future* could not refer to the physical world. What then accounts for the human experiences of past, present, and future? Augustine's answer was surprisingly modern.

> It is in thee, my mind, that I measure times…. The impression, which things as they pass by cause in thee, remains even when they are gone; this it is which still present, I measure, not the things which pass by to make this impression. (Pusey, 1961, p. 203)

For Augustine, then, the experience of time depended on sensory experience and the memory of sensory experience. In a sense, humans, like God, experience only the present. The past is the presence in the mind of things remembered, and the future is the present anticipation of events based on the memory of past experience. The present is simply current sensory experience (see, interestingly, Dapkus, 1985).

Augustine wrote extensively on memory, and some of his observations were not unlike those that emerged later in modern empiricism (see Chapter 5). One example is his concept of the memory trace, which he described as follows:

> Although when past facts are related, there are drawn out the memory, not the things themselves which are past, but words which, conceived by the images of the things, they, in passing, have through the senses left as traces in the mind. (Pusey, 1961, p. 197)

THE DARK AGES

Some historians mark the beginning of the Middle Ages, also known as the Dark Ages, with the sack of Rome by the Visigoths in 410; others with the death of Augustine in 430; others with the abdication of the last Roman emperor in 476; and some even slightly later. In any case, it is about this time in history when Greek and Roman books were all but lost. *The Consolation of Philosophy*, written by the Roman noble Boethius (ca. 480–525) while he awaited his execution, accounts for almost all that was known about Plato and Aristotle in the West for several hundred years. Indeed, with few exceptions, the following centuries saw little, if any, progress made in science, philosophy, and literature. The Palatine School was organized for Charlemagne's courtiers by the monk Alcuin (ca. 742–804)—who admonished his brothers that it was better to write books than work with a spade. But reality usually proved otherwise, and Alcuin's successor, the Irish monk John Scotus Erigena is said to have been killed by his students with their writing pens.

In general, Roman law had collapsed and was replaced by a variety of local or Germanic customs. Villages armed themselves against attack from both their neighbors and invaders from afar. What attention could be given to philosophy and science with an enemy at the gate? Even the most basic education was limited to priests, monks, and the nobility. During all this uncertainty, or perhaps because of it, the Christian church became increasingly powerful. From about 400 to 1000, the lands that would become Europe were generally dark.

Although the Middle Ages are often dismissed as anti-intellectual, that is a somewhat misleading simplification. Most of those able to produce new writings had been trained by the Church, and to pursue matters outside of the Church's interest was suspect. For example, St. Peter Damien (1007–1072) was known for his "vicious attacks on … all that which involved the slightest reliance upon the power of natural reason" (Gilson, 1954, p.13). But Damien, like Jerome before him, was himself a scholar who valued education. He was concerned that philosophy serve only as the handmaid to theology, and feared "the handmaid of theology, is bidding to become the mistress."

The Church wielded tremendous power during the early Middle Ages. The question of what was true had already been answered, and there was no need to look elsewhere. People were either believers or heretics, and heretics were often dealt with harshly. The church owned vast properties; the pope could make or break kings; and priests controlled the behavior, feelings, and thoughts of the citizens. The eight crusades (1095–1291) against the Muslims showed Christianity's power to organize its followers to stop the Islamic influence that had been spreading so rapidly.

It was during these "holy wars" that Aristotle's writings were rediscovered. Many centuries earlier, mainly because of the conquests of Alexander the Great, Greek influence had been spread over a large area. Greek philosophy, science, and art continued to flourish in territories later conquered by the Muslims. As such, Aristotle's works were preserved in the great Islamic universities and mosques and were used to develop Islamic philosophy, religion,

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mathematics, and medicine. The Muslim armies moved west, and the Christian armies moved east. The clash between the two resulted in the bloody holy wars, but it also brought the West back into contact with Aristotle's philosophy. At first, church authorities welcomed Aristotle's writings; then, after more careful analysis, it was clear that for Aristotle's thoughts to be "accepted," they needed to be Christianized.

Long before Aristotle's writings were rediscovered by the West, however, the Muslims were benefiting greatly from them. In fact, more than 200 years before the West attempted to Christianize Aristotle's philosophy, several Muslim philosophers busied themselves attempting to make it compatible with Islam.

ISLAMIC AND JEWISH INFLUENCES

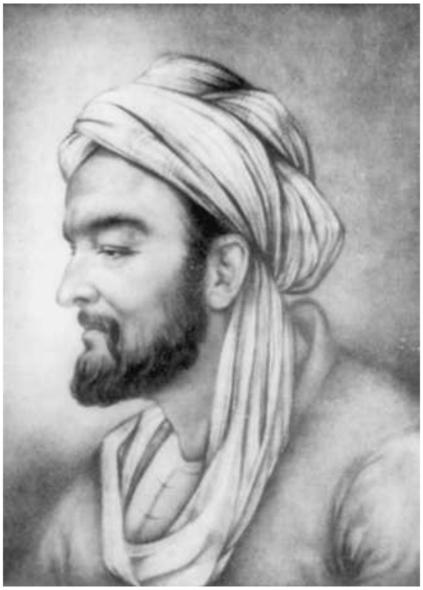
The Dark Ages are of course dark only with reference to the Western world, and during this same time, Islam became a powerful force. Muhammad was born in Mecca in 570, and in middle age, believers say he received a revelation from God instructing him to preach. He called his religion Islam, which means "surrender to God," and his followers were called Muslims (or Moslems). His teachings are contained in the Koran. Islam spread with incredible speed, and within 30 years of Muhammad's death in 632, the Muslims had conquered Arabia, Syria, Egypt, Persia, Sicily, and Spain. Within 100 years after the prophet's death, the Islamic empire extended over an area larger than that of the Roman Empire at its peak.

Islamic philosophers translated, studied, and expanded on the ancient wisdom of Greece (and Rome). By utilizing this wisdom, the Muslims made great strides in medicine, science, and mathematics—subjects that were of great importance during the expansion of the Islamic empire because of their practical value. When conditions stabilized, however, there was greater interest in making the ancient wisdom compatible with Islam. Although these efforts focused mainly on Aristotle's philosophy, Neoplatonism was also examined. The Arabic translations of the Greek philosophers, and the questions raised in attempting to make this ancient wisdom compatible with Islam, were used many years later when the Christians attempted to make them compatible with Christianity. Not surprisingly then, the two efforts were similar.

During this period, there were many outstanding Muslim scientists and philosophers, including Alhazen and al-Kindi, who focused upon psychological matters such as perception, but we will briefly consider only two: Avicenna and Averroës.

Avicenna

Avicenna (Persian name, Ibn Sina; 980–1037) was a child prodigy who had memorized the Koran by the age of 10. As an adolescent, "he had read Aristotle's *Metaphysics* forty times and could practically recite it by heart" (Goodman, 1992, p. 38). He became a physician before he was 20, and as a young man was considered the best of the Muslim physicians (Alexander & Selesnick, 1966). He wrote books on many topics, including medicine, mathematics, logic, metaphysics, Islamic theology, astronomy, politics, and linguistics. His book on medicine,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Avicenna

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The Canon, was used in European universities for more than five centuries (S. Smith, 1983). In most of his work, he borrowed heavily from Aristotle, but he made modifications in Aristotle's philosophy that persisted for hundreds of years.

In his analysis of human thinking, Avicenna started with the five external senses—sight, hearing, touch, taste, and smell. Then he postulated seven "interior senses," which were arranged in a hierarchy. First is the common sense, which synthesizes the information provided by the external senses. Second is retentive imagination, the ability to remember the synthesized information from the common sense. The third and fourth are compositive animal imagination and compositive human imagination. Compositive imagination allows both humans and animals to learn what to approach or avoid in the environment. For animals, this is a strictly associative process. Those objects or events associated with pain are subsequently avoided, and those associated with pleasure are subsequently approached. Human compositive imagination, however, allows the creative combination of information from the common sense and from the retentive imagination. For example, humans can imagine a unicorn without ever having experienced one; nonhuman animals do not possess this ability. Fifth is the estimative power, the innate ability to make judgments about environmental objects. Sixth is the ability to remember the outcomes of all the information processing that occurs lower in the hierarchy, and seventh is the ability to use that information.

Although Aristotle postulated only three internal senses (common sense, imagination, and memory) and Avicenna seven, Avicenna was essentially an Aristotelian. His major departure from Aristotle's philosophy concerns the active intellect. For Aristotle, the active intellect was used in understanding the universal principles that could not be gained by simply observing empirical events. For Avicenna, the active intellect took on supernatural qualities; it was the aspect of humans that allowed them to understand the cosmic plan and to enter into a relationship with God. For Avicenna, an understanding of God represented the highest level of intellectual functioning.

As a physician, Avicenna employed a wide range of treatments for physical and mental illnesses. For example, he attempted to treat melancholic patients by reading to them or by using music as therapy. At times, he even tried to frighten patients out of their ailments. Alexander and Selesnick (1966) give the following example:

> When one of his patients claimed he was a cow and bellowed like one, Avicenna told the patient that a butcher was coming to slaughter him. The patient was bound hand and foot; then Avicenna proclaimed that he was too lean and had to be fattened, and untied him. The patient began to eat enthusiastically "gained strength, gave up the delusion, and was cured." (p. 64)

Avicenna's work had great significance for subsequent philosophical development in the West: "Had it not been for Avicenna and his colleagues in the Islamic world of the eleventh century, the philosophical achievements of twelfth- and thirteenth-century Europe—achievements based so sturdily upon Aristotelianism—are nearly unimaginable" (D. N. Robinson, 1986, p. 145).

Averroës

Averroës (Persian name, Ibn Rushd; 1126–1198) was born in what is now Cordova, Spain. He disagreed with Avicenna about the arrangement of human intelligences, believing that all human experiences reflect God's influence. Averroës' writings are mainly commentaries on Aristotle's philosophy, with special emphasis on Aristotle's work on the senses, memory, and sleep. Also, following Aristotle, Averroës said that only the active intellect aspect of the soul survives death, and because the active intellect is the same for everyone, nothing personal survives death. This was, of course, contrary to Christian thought, and Averroës' interpretation of Aristotle on this point was labeled Averroism and was severely attacked by later Christian philosophers.

Although Averroës was known primarily for his philosophical work, he also made a number of

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Averroës

impressive scientific contributions. For example, Crombie (1961) credits him with discovering that the retina, not the lens, is the light-sensitive part of the eye. He was also among the first to observe that those afflicted with smallpox and who survived were thereafter immune to the disease, thus suggesting inoculation as a way of preventing disease.

Maimonides

Maimonides (or Moses ben Maimon; 1135–1204) was a Jew, and like Averroës, was born in Cordova, Spain, where, at the time, Jews and Muslims lived in harmony. Maimonides, in addition to being a biblical and talmudic scholar, was a physician who, among other things, anticipated the modern concern with psychosomatic disorders by showing the relationship between ethical living and mental health (Alexander & Selesnick, 1966).

Maimonides wrote *The Guide for the Perplexed* (Friedländer, 1956) for scholars who were confused by the apparent conflict between religion and the scientific and philosophical thought of the day. Specifically, Maimonides sought a reconciliation between Judaism and Aristotelian philosophy. He attempted to show that many passages from the Old Testament and the Talmud could be understood rationally and, therefore, need not be taken on faith alone. Other passages were to be understood only as allegory and not taken as literally true. Maimonides went so far as to say that if something is demonstrably false, it should be rejected, even if it is stated as true in the Bible or the Talmud. For example, when he was asked his opinion of astrology, which is mentioned in the Bible and the Talmud as true, Maimonides said,

> Man should only believe what he can grasp with his intellectual faculties, or perceive by his senses, or what he can accept on trustworthy authority. Beyond this nothing should be believed. Astrological statements, not being founded on any of these sources of knowledge must be rejected. (Friedländer, 1956, p. xxv)

Like the Muslim philosophers, Maimonides' efforts to reconcile faith and reason, or more specifically, Judaism and Aristotelianism, were to substantially influence Christian theologians when they would later attempt to do the same for their religion.

RECONCILIATION OF CHRISTIAN FAITH AND REASON

St. Anselm

In *Faith Seeking Understanding*, **St. Anselm (ca. 1033–1109)** argued that perception and reason can and should supplement Christian faith. Although St. Anselm was basically an Augustinian, his acceptance of reason as a means of understanding God represented a major departure from Christian tradition, which had emphasized faith. St. Anselm exemplified how reason could be used within theology with his famous **ontological argument for the existence of God** (see Deane, 1962). This is a complex argument, but essentially it says that if we can think of something, something must be causing the thought. That is, when we think of things, there must exist real things corresponding to those thoughts (reification).

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St. Anselm beckoned us to continue thinking of a being until we could think of no better or greater a being "than which nothing greater can be conceived." This perfect being that we have conjured up is God, and because we can think of him, he exists. Of course, the existence of the devil can be "proved" by applying the same logic in reverse. St. Anselm was one of the first Christian theologians to attempt to use logic to support religious belief. St. Anselm, like all Christian theologians at the time, was attempting to support what he already believed to be true. In other words, faith preceded efforts to understand. Addressing God, St. Anselm said,

> I long to understand in some degree thy truth, which my heart believes and loves. For I do not seek to understand that I may believe, but I believe in order to understand. For this also I believe—that unless I believe, I should not understand. (Deane, 1962, p. 53)

St. Anselm's ontological argument for the existence of God was highly influential and was later accepted by such notable philosophers as Descartes and Leibniz. On the other hand, the argument has been a target of criticism for centuries (see, for example, Bencivenga, 1993). Others, however, believe Anselm's argument has been generally misunderstood and has considerable validity (see, for example, Hartshorne, 1965).

Another Augustinian, **Peter Lombard (ca. 1095–1160)** argued even more forcefully for the place of reason within Christianity than did St. Anselm. Perhaps even more important, Lombard insisted that God could be known by studying his works. There is no need to escape from the empirical world to understand God; one can learn about God by studying the empirical world. Thus, for Lombard, there were three ways to learn about God: faith, reason, and the study of God's works (the empirical world). Philosophers such as St. Anselm and Lombard helped create a receptive atmosphere for the works of Aristotle, which were about to have a major and long-lasting impact on Western philosophy.

SCHOLASTICISM

The holy wars had brought the Western world into contact with the works of Aristotle and other Greeks. The reaction of the church to the recovered works from antiquity occurred in three stages. At first the works were welcomed, but when the inconsistencies with church dogma were realized, the works were often condemned as pagan. Finally, efforts were made to modify the works, especially those of Aristotle, and in modified form, they were incorporated into church dogma. Some of the keenest minds in the history of Western thought took on the monumental tasks of synthesizing Aristotle's philosophy and Christian theology and showing what implications that synthesis had for living one's life. This synthesis came to be called **Scholasticism**.

Peter Abelard

In addition to translating Aristotle's writings, **Peter Abelard (1079–1142)** introduced a method of study that was to characterize the Scholastic period. In his book *Sic et Non* (sometimes translated as *For and Against* and sometimes as *Yes and No*), Abelard elaborated his **dialectic method**. He listed some 158 theological questions that were answered in contradictory ways by scripture and by various Christian theologians. Abelard believed that examining arguments and counterarguments was a good way of clarifying issues and of arriving at valid conclusions. His goal was not to contradict church dogma but to overcome inconsistencies in the statements made by theologians through the years. Using his dialectic method, he pitted conflicting authorities against one another; but through it all, the authority of the Bible was expected to prevail. The dialectic method was controversial because it sometimes seemed to question the validity of religious assumptions. Abelard was not overly concerned about this issue, however, because he believed that God existed and therefore all methods of inquiry would prove it. The believer, then, has nothing to fear from logic, reason, or even the direct study of nature.

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Realism versus Nominalism. During Abelard's time, there was great debate over whether universals existed—that is, whether there really are essences such as "catness," "humanness," or "sweetness" independent of individual instances of such things. One side said yes, such essences do exist in pure form and individual members of such classes differ only by accident. Those claiming that universals and essences had a real, independent existence were called realists. The other side—the nominalists—said that what we call universals are nothing more than verbal labels allowing the grouping of objects or events that resemble one another.

At this time, the cathedral school of Notre Dame, in Paris, was the most famous school in Christendom, and William of Champeaux was its most famous teacher. His lecture hall was typically filled with students from all over Europe, and "the excitement produced by his brilliant discourses sometimes ran so high that the civil authorities were obliged to interfere in the interests of good order" (Luddy, 1947, p. 3). At the age of 20, Abelard decided to debate William on the matter of **realism** versus **nominalism**. William was a devout and informed realist, but Abelard, using his considerable skills in rhetoric and logic, skillfully exposed the fallacies in William's position. The main thrust of Abelard's argument was that we should not confuse words with things. The conclusions reached when logic is applied to words do not necessarily generalize to the physical world. When applied to the debate concerning universals, this meant that just because we use words to describe and understand universals, and even use words to logically deduce their existence, it does not *necessarily* follow that they actually exist. Abelard argued that logic and physics were two different disciplines, and he wanted to keep them sharply separate. Abelard accused William of confusing the two disciplines, and in the process, committing the fallacy of reification (believing that if you can name something, there must necessarily be something real that corresponds to the name).

Abelard proposed **conceptualism** as a compromise between realism and nominalism. He argued that universal essences do not exist but similarities among categories of experiences do. For example, all instances of things we call beautiful have something in common. Based on the commonalities, we form the *concept* of beauty. Thus, concepts summarize individual experiences (nominalism) but, once formed, concepts, in a sense, exist apart from the individual experiences upon which they were formed (realism). Radice (1974) summarizes Abelard's conceptualism as follows: "Universals were neither realities nor mere names but the concepts formed by the intellect when abstracting the similarities between perceived individual things" (p. 14).

Abelard decided to open his own school, and as a teacher he displayed "a most amazing originality, vivacity and versatility" (Luddy, 1947, p. 6). Soon Abelard, or "Master Peter" as his students called him, was so famous a teacher that the classrooms of the older professors were essentially empty:

> His eloquence, wit and power of luminous exposition, his magnificent voice, noble bearing, and beauty of face and figure, his boldness in criticising the most venerable authorities and attempting a natural solution of the mysteries of faith: all combined to make him beyond comparison the most popular teacher of his age. (Luddy, 1947, pp. 6–7)

Abelard's Relationship with Heloise. And so continued Abelard's fame and glory until, at the age of 42, he met Heloise, a girl of 17. As a canon of Notre Dame, Abelard's fame and influence as a teacher brought him wealth and distinction, which pleased his friends but angered his enemies, such as his old teacher, William of Champeaux. However, for Abelard, success created a problem:

> Success always puffs up fools with pride, and worldly security weakens the spirit's resolution and easily destroys it through carnal temptations. I began to think myself the only philosopher in the world, with nothing to fear from anyone, and so I yielded to the lusts of the flesh. (Radice, 1974, p. 65)

Heloise was the bright and beautiful niece of another canon of Notre Dame named Fulbert. By his own admission, when Abelard first saw Heloise, he set out to seduce her. Heloise's uncle, who loved her dearly, was very much interested in continuing her education, and being aware of Abelard's considerable skill as a scholar and teacher, he struck a deal with Abelard. The uncle offered Abelard room and board in his (and Heloise's) home if Abelard would agree to tutor his niece. Abelard was astonished at the canon's naïveté: "I was amazed by his simplicity—if he had entrusted a tender lamb to a ravening wolf it would not have surprised me more" (Radice, 1974, p. 67). Abelard described what happened next:

> With our lessons as a pretext we abandoned ourselves entirely to love. Her studies allowed us to withdraw in private, as love desired, and then with our books open before us, more words of love than our reading passed between us, and more kissing than teaching. My hands strayed oftener to her bosoms than to the pages; love drew our eyes to look on each other more than reading kept them on our texts. To avert suspicion I sometimes struck her, but these blows were prompted by love and tender feeling rather than anger and irritation, and were sweeter than any balm could be. In short, our desires left no stage of love-making untried, and if love could devise something new, we welcomed it. We entered on each joy the more eagerly for our previous inexperience, and were the less easily sated. (Radice, 1974, pp. 67–68)

The "tutoring" went on for several months before Heloise's uncle found out what was happening and threw Abelard out of the house. When Heloise announced her pregnancy, Abelard took her to his sister's home where she eventually gave birth to their son, Astralabe. Abelard offered to marry Heloise, but she at first refused because she believed that marriage would damage his chances of advancement within the church. In addition, both had a low opinion of marriage and cited scripture, church authorities, and a number of practical concerns to support that opinion. So, Heloise would have preferred to remain Abelard's mistress. To emphasize her point, Heloise famously said,

> God is my witness that if Augustus, Emperor of the whole world, thought fit to honour me with marriage and conferred all the earth on me to possess forever, it would be dearer and more honourable to me to be called not his Empress but your whore. (Radice, 1974, p. 114)

But marry they did. For various reasons, Abelard wanted to keep the marriage a secret, and Heloise's uncle wanted it known for fear of Heloise's reputation. Finally, Abelard could stand the strain no longer, and he dressed Heloise in a nun's habit and took her to a convent, where she could appear to be a nun without actually taking vows. There, Abelard would secretly visit his loved one from time to time.

Believing that Abelard had forced Heloise to become a nun to cover his own sins, her uncle's wrath became uncontrollable. Abelard described the action taken by the uncle and some of his aides:

> One night as I slept peacefully in an inner room in my lodging, they bribed one of my servants to admit them and took cruel vengeance on me of such appalling barbarity as to shock the whole world; they cut off the parts of my body whereby I had committed the wrong of which they complained. (Radice, 1974, p. 75)

Other than for the obvious reasons, this particular form of punishment for his sins was especially distressing for Abelard because he recalled passages of the Bible that condemned castrated individuals. For example, "He whose testicles are crushed or whose male member is cut off shall not enter the assembly of the Lord (Deuteronomy 23:1). Incidentally, two of those responsible for Abelard's castration were caught, blinded, and themselves castrated" (Radice, 1974, p. 75).

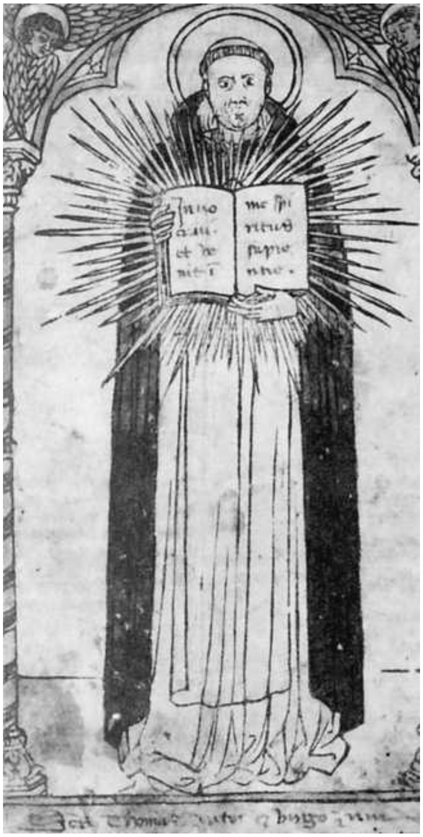
Abelard became a monk, Heloise became a nun, and their future intercourse was limited to romantic and spicy love letters. After recovering from his ordeal, Abelard resumed his studies and his teaching using the dialectic method. This controversial method and his abrasive manner again led to trouble with church authorities. In 1140, Pope Innocent II ordered Abelard to stop teaching and writing, and within a few years he died a lonely and bitter man. Heloise became the widely respected and influential abbess of the Paraclete, a school and monastery founded many years earlier by Abelard. The Paraclete survived as a center of learning until the French Revolution. Heloise outlived Abelard by some 21 years and was buried beside him at the Paraclete.

St. Thomas Aquinas

St. Thomas Aquinas (ca. 1225–1274) was a large, introspective person, whom his fellow students referred to as the dumb ox. He came from a distinguished, aristocratic family, and his father had considerable influence at the Benedictine abbey of Monte Cassino, which was only a few miles from their castle home. It was assumed that following his training for the priesthood, Aquinas would return to Monte Cassino, where the family's influence would help him become abbot. Instead, he joined the Dominican order and became a begging friar. With this decision, Aquinas turned his back on family wealth and power and reduced his chances of advancement within the church hierarchy. His father had already died, but his mother was so angered by Aquinas's choice that she and a group of relatives kidnapped and imprisoned him in their family castle for about a year. Strangely enough, the imprisonment did not anger him. In fact, he spent the time attempting to convert his family members. Aquinas did become angry, however, when his brothers tested his willingness to remain chaste by slipping a seductive prostitute into his prison quarters. He drove her from the room with a hot iron from the fire. He was distressed that his brothers believed that something so mundane would tempt him.

In 1245, Aquinas was set free by his family, and he returned to the Dominicans. As a student, Aquinas was prodigious. The University of Paris had a rule that a doctorate in theology could not be earned until after one's 34th birthday. An exception was made in Aquinas's case, however, and the degree was given to him at the age of 31. He was then appointed to one of the two Dominican chairs at the University of Paris.

At Paris, Aquinas became associated with **St. Albertus Magnus (ca. 1200–1280)**, who was one of the first Western philosophers to make a comprehensive review of both Aristotle's works and the Islamic and Jewish scholars' interpretations of them. Following Aristotle, Magnus performed detailed observations of nature, and he himself made significant contributions to science. Magnus presented Aristotle's views on sensation, intelligence,



St. Thomas Aquinas

Rosenwald Collection, © 2000 Board of Trustees, National Gallery of Art, Washington, DC. ca. 1450 woodcut hand-colored in dark brown, orange, and yellow; with inscription in pen and ink, (Schreiber IX 1700cm.)

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and memory to the church scholars and attempted to show how human beings' rational powers could be used to achieve salvation.

Building upon this, Aquinas did as much as anyone to synthesize Aristotle's philosophical works and the Christian tradition. This was a major feat, but it had an important negative aspect. Once Aristotle's ideas were assimilated into church dogma, they were no longer challengeable. In fact, Aristotle's writings became almost as sacred as the Bible. With Aristotle, as earlier with Plato, the church emphasized those ideas that were most compatible with its theology. Although Aristotle had said much that, with minor shifts and embellishments, could be construed as supporting church doctrine—for example, his thoughts on the immortality of active reason, on the *scala naturae* (the hierarchical design of nature), on the earth being the center of the universe, and on the unmoved mover—ideas that were not compatible were either changed or ignored.

The Reconciliation of Faith and Reason. The Aristotelian emphasis on reason was so great that it could not be ignored. After all, the huge body of information Aristotle had generated was a product of empirical observation guided by reason. This emphasis on reason placed the church in a difficult position because, from its inception, it had emphasized revelation, faith, and spiritual experience and minimized empirical observation and rationality. It turned out that Aquinas's greatest task (and achievement) was the reconciliation of faith and reason. For him, as for the other Scholastics, all paths led to the same truth—God and his glory. Thus, God could now be known through revelation; through scripture; through examination of inner experience; or through logic, reason, and the examination of nature.

Although sensory information was again accepted as an accurate source of knowledge, Aquinas, following Aristotle, said that the senses could provide information only about particulars, not about universals, which reason must abstract from sensory information. Reason and faith cannot conflict because both lead to the same ultimate reality, God. The philosopher uses logical proof and demonstration to verify God's existence, whereas the Christian theologian takes the existence of God on faith. Each arrives at the same truth but by different means. Aquinas spent considerable time discussing the differences between humans and lower animals. The biggest difference, he recognized, was that nonhuman animals do not possess rational souls and therefore Aquinas determined that salvation is not available to them.

Aquinas's synthesis of Aristotelian and Christian thought was bitterly debated within the church. One of the most influential voices of conservatism was **St. Bonaventure (ca. 1217–1274)**, who condemned the works of Aristotle. Bonaventure, following Augustine, believed that one comes to know God through introspection, not through reasoning or by studying nature. Aquinas's position prevailed, however, and was finally accepted as official church doctrine. With some modifications, it remains a philosophical cornerstone of Catholicism to this day. The view represented by Bonaventure lives on in Protestantism, where scripture is valued more highly than reason and a personal relationship with God is valued more highly than ritual and church prescriptions.

Aquinas's Influence. Aquinas's work eventually had several effects: It divided reason and faith, making it possible to study them separately, it made the study of nature respectable, and it showed the world that argument over church dogma was possible. Although his goal was to strengthen the position of the church by admitting reason as a means of understanding God, Aquinas's work also had the opposite effect. Several philosophers following Aquinas argued that faith and reason could be studied separately and that reason could be studied without considering its theological implications. Philosophy without religious overtones was becoming a possibility—a possibility that had not existed for hundreds of years.

Aquinas at least partially shifted attention away from the heavens and back to earth, although his emphasis was still on theology. This shift had to occur before the Renaissance could take place. The Renaissance was still in the future, however, and the church still controlled most human activities.

WILLIAM OF OCCAM: A TURNING POINT

William of Occam (sometimes spelled *Ockham*; ca. 1285–1349), a British-born Franciscan monk, accepted Aquinas's division of faith and reason, and then pursued the latter. Occam believed that in explaining things, no unnecessary assumptions should be made—in other words, that explanations should always be kept as parsimonious (simple) as possible. This belief that extraneous assumptions should be "shaved" from explanations or arguments came to be known as **Occam's razor**. In his extensive writings, Occam stated his principle in several ways—for example, "It is futile to do with many what can be done with fewer" and "Plurality should not be assumed without necessity" (Kemp, 1998, p. 280).

Occam applied his "razor" to the debate concerning the existence of universals. As we have seen, realist scholars believed that universal ideas or principles existed and that individual empirical experiences were only manifestations of those universals. Conversely, nominalist scholars believed that so-called universals were nothing more than verbal labels used to describe groups of experiences that had something in common. Because Occam saw the assumption that universals had an independent existence as unnecessary, he sided with the nominalists, arguing forcefully that so-called universals were nothing more than verbal labels. For example, because all cats have certain features in common, it is convenient to label all objects with those features as cats. The same thing is true for dogs, trees, books, or any other class of objects or experiences. According to Occam, the fact that experiences have features in common allows us to use general labels to describe those experiences; but the use of such labels does not mean that there is a pure idea, essence, or form that exists beyond our experiences. Occam believed we can trust our senses to tell us what the world is really like, that we can know the world directly without needing to worry about what lurks beyond our experience.

Occam changed the question concerning the nature of knowledge from a metaphysical problem to a psychological problem. He was not concerned with a transcendent reality that could be understood only by abstract reasoning or intense introspection. For him, the question was how the mind classifies experience, and his answer was that we habitually respond to similar objects in a similar way. We apply the term *female* to a person because that person has enough in common with others we have called female. For Occam, the assumption that some female essence exists was unnecessary. We can simply assume that nature is as we experience it.

In his empiricism, Occam went beyond Aristotle. Aristotle believed that sensory experience was the basis of knowledge but that reason needed to be applied to extract knowledge of universals and essences from individual experiences. For Occam, sensory experience provided information about the world—*period*. Occam's philosophy marks the end of Scholasticism. Despite the church's efforts to suppress them, Occam's views were widely taught and can be viewed as the beginning of modern empirical philosophy. Indeed, we see in Occam a strong hint of the coming Renaissance. Despite his radical empiricism, Occam was still a Franciscan monk, and he believed in God. He did say, however, that God's existence could never be confirmed by studying nature because there was nothing in nature that directly proved his existence. God's existence, then, must be accepted on faith.

THE SPIRIT OF THE TIMES BEFORE THE RENAISSANCE

As the Middle Age advanced, slowly the study of science began to reemerge, albeit as something of an anomaly to the prevailing paradigm of theology. Southern (1986) notes Adelard of Bath, who traveled into the Arab world to bring back the "old and forgotten sciences" and Robert Grosseteste (ca. 1175–1253), who was the first chancellor of Oxford

University. Grosseteste wrote extensively about science (including perception) and the use of Aristotelian methods for conducting science. A student at Oxford, Roger Bacon's (ca. 1214–1292) interest in applied optics (creating telescopes and microscopes), chemistry, explosives, and even flight went too far, and he was imprisoned for sorcery. And, in a clear anticipation of the modern computer, Raymond Lull (ca. 1232–1315) conceived of and built machines that would apply Aristotelian logic to help convert Moslems and Jews to Christianity (Moody, 1967).

Still, even by the 14th and 15th centuries, philosophy served religion, as did everyone and everything else. There were two classes of people: believers and nonbelievers. The latter, if they could not be converted, were punished, imprisoned, or killed, and they were considered either stupid or possessed by the devil. There was no in-between. If the God contemplated through introspection was real, so must other objects of thought be real, such as demons, devils, and dragons. Astrology was extremely popular, and magic was practiced extensively. Superstition was not confined only to the peasant but also characterized kings, scholars, and clergy.

As Bacon learned, this was not yet a time of open inquiry. To use Kuhn's (1996) terminology, scholarship was limited to a single paradigm: the Christian conception of humans and the world. Although Kuhn was mainly concerned with science, his notion of paradigms can also be applied to other fields. As with other paradigms, the Christian paradigm determined what was acceptable as a problem and what counted as a solution. Most scholars were engaged in "normal philosophy," which, like normal science, is concerned only with exploring the implications of the accepted paradigm. Little creativity is involved in either normal science or normal philosophy. Kuhn tells us that for there to be a paradigm shift, anomalies must arise within the accepted paradigm; that is, consistent observations that cannot be explained must occur. As the anomalies persist, a new paradigm gradually gains recruits and eventually overthrows the old paradigm. The process is long, difficult, and often traumatic for the early dissenters from the old ways.

In the period before the Renaissance, anomalies were appearing everywhere in Christian doctrine, and it was clear that church authority was on the decline. For centuries there had been little philosophical, scientific, or theological growth. For progress to occur, the authority of the church had to be broken, and the cracks were beginning to appear.

SUMMARY

After Aristotle's death, philosophers began to concern themselves with principles of human conduct and asked the question, What constitutes the good life? Pyrrho preached Skepticism. To him, nothing could be known with certainty, so why believe anything? Antisthenes and Diogenes advocated a back-to-nature approach to life because they viewed society as a distortion of nature that should be rejected. A simple life, close to nature and free of wants and passions, was best. The position of Antisthenes and Diogenes was later called Cynicism. Epicurus said the good life involved seeking the greatest amount of pleasure over the longest period of time. Such pleasure did not come from having too little or too much but from a life of moderation. Zeno, the founder of Stoicism, claimed that the good life involved living in harmony with nature, which was designed in accordance with a divine plan. Because everything happens for a reason, one should accept whatever happens with courage and indifference. The Stoics believed material possessions to be unimportant, and they emphasized virtue (the acceptance of one's fate). Stoicism flourished in Rome, and emperor Marcus Aurelius was one of its most important advocates.

Clearly, the preceding moral philosophers were often contradictory, and they lacked a firm philosophical base. This problem was "solved" when philosophers switched their attention from ethics to religion. Philo, a Neoplatonist, combined Judaism with Plato's philosophy and created a system that glorified the spirit and condemned the flesh.

Plotinus, another Neoplatonist, believed that from the One (God) emanates the Spirit, from the Spirit emanates the Soul, and from the Soul emanates the physical world. The Soul then reflects the Spirit and God. Like all the Neoplatonists, Plotinus taught that it is only by pondering the contents of the Soul that one can embrace eternal, immutable truth. St. Paul claimed that Jesus was the son of God and thereby established the Christian religion. In 313, Emperor Constantine made Christianity a tolerated religion in the Roman Empire, and under his leadership, the many diverse versions of Christianity that existed at the time were transformed into a standard set of documents and beliefs.

St. Augustine said that humans can know God through intense introspection. The ecstasy that comes from cognitively embracing God was considered the highest human emotion and could be achieved only by avoiding or minimizing experiences of the flesh. By postulating human free will, Augustine accomplished several things: He explained evil as the result of humans choosing evil over good, humans became responsible for their own destiny, and personal guilt became an important means of controlling behavior. Augustine claimed that an internal sense reveals to each person how he or she should act as a Christian. Acting contrary to this internal sense, or even intending to act contrary to it, causes guilt. Augustine argued that the experiences of the past, present, and future are accounted for by memories, ongoing sensory impressions, and anticipations, respectively.

During the Dark Ages, progress in the West was limited, but Islamic culture flourished and expanded. Muslim and Jewish scholars translated the works of the Greek and Roman philosophers and used this wisdom to make great advances in medicine, science, and mathematics. Avicenna and Averroës concentrated mainly on the works of Aristotle, translating and expanding them and attempting to make them compatible with Islam. Maimonides attempted, among other things, to reconcile Aristotelianism with Judaism.

Before the Western world could embrace Aristotle's philosophy, human reasoning powers had to be made respectable. St. Anselm and Peter Lombard were instrumental in showing that reason and faith were compatible, whereas Abelard and St. Albertus Magnus were among the first Western philosopher-theologians to embrace the work of Aristotle. Within the church, there was a debate between the realists and the nominalists. The realists believed in the existence of universal (essences), of which individual, empirical events were only manifestations. The nominalists believed that so-called universals were nothing more than verbal labels applied to classes of experiences. Abelard offered a compromise solution to the problem. According to his conceptualism, concepts were viewed as less than essences but more than mere words.

Those who attempted to synthesize Aristotle's philosophy with the Christian religion were called Scholastics. The greatest Scholastic was St. Thomas Aquinas, and the major outcome of his work was the acceptance of both reason and faith as ways of knowing God. Before Aquinas, faith alone had been emphasized. The acceptance of reason as a means of knowing God made respectable the examination of nature, the use of logical argument, and even debate within the church itself. It is widely believed that Aquinas inadvertently created an atmosphere that led ultimately to the decline of church authority and therefore to the Renaissance.

Concerning the realism-nominalism debate, William of Occam sided with the nominalists by explaining universals as simply verbal labels. He took this position because it required the fewest assumptions. Occam's razor is the belief that of two or more adequate explanations, the one requiring the fewest assumptions should be chosen.

In the heyday of early Christianity, a largely negative social climate prevailed in the Western world. There was widespread superstition, fear, and persecution of nonbelievers. The church had absolute power, and any dissension from church dogma was dealt with harshly. Clearly, the spirit of the times was not conducive to open, objective inquiry. For such inquiry to occur, a paradigm shift was required, and the seeds of such a shift could be seen in the reemergence of science not in the service of theology.

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DISCUSSION QUESTIONS

1. Briefly state what constituted the good life according to Skepticism, Cynicism, Epicureanism, and Stoicism.
2. What did the Skeptics mean by *dogmatism*, and why did they oppose it?
3. In what sense were Epicureanism and Stoicism materialistic philosophies?
4. Describe the factors that contributed to the development of early Christian theology.
5. What characterized the Pauline version of Christianity?
6. Summarize the philosophy of Neoplatonism.
7. Discuss how Constantine influenced the history of Christianity.
8. How did Augustine change the locus of control of human behavior from forces outside the person to forces inside the person?
9. What did Augustine feel about pagan writings? What did he believe humans could be certain of, and how did he arrive at his conclusion? How, according to Augustine, could humans best experience God?
10. In what ways were the Dark Ages dark? Explain.
11. What was the importance of Avicenna's, Averroës', and Mainonides' philosophies to Western thought?
12. How did the works of St. Anselm help prepare the Western world for the acceptance of Aristotle's philosophy?
13. What was St. Anselm's ontological argument for the existence of God?
14. What was the significance of the work of Abelard and Magnus?
15. Summarize the debate between the realists and the nominalists. What was Abelard's position in this debate?
16. How, according to Aquinas, can humans know God? What are some of the implications of Aquinas's position?
17. What was Scholasticism? Give an example of what the Scholastics did.
18. Why does William of Occam represent an important turning point in the history of psychology? What is Occam's razor?
19. Was William of Occam a realist or a nominalist? Explain.
20. What was the paradigm in the Middle Age? What anomalies may have existed?

SUGGESTIONS FOR FURTHER READING

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GLOSSARY

Abelard, Peter (1079–1142) One of the first Western philosopher-theologians to emphasize the works of Aristotle.

Anselm, St. (ca. 1033–1109) Argued that sense perception and rational powers should supplement faith. (See also *Ontological argument for the existence of God.*)

Antisthenes (ca. 445–365 B.C.) Founder of Cynicism.

Aquinas, St. Thomas (1225–1274) Epitomized Scholasticism. He sought to "Christianize" the works of Aristotle and to show that both faith and reason lead to the truth of God's existence.

Augustine, St. (354–430) After having demonstrated the validity of inner, subjective experience, said that one can know God through introspection as well as through the revealed truth of the scriptures. Augustine also wrote extensively on human free will.

Averroës (1126–1198) A Muslim physician and philosopher, who, among other things, wrote commentaries on Aristotle's work on the senses, memory, sleep and waking, and dreams.

Avicenna (980–1037) A Muslim physician and philosopher whose translations of, and commentaries on, the works of Aristotle strongly influenced subsequent Western philosophers.

Bonaventure, St. (ca. 1217–1274) A contemporary of St. Thomas Aquinas who argued that Christianity should remain Augustinian and should reject any effort to assimilate Aristotelian philosophy into church dogma.

Conceptualism Abelard's proposed solution to the realism-nominalism debate. Abelard argued that concepts do not have independent existence (realism), but that, being abstractions, they are more than mere names (nominalism).

Constantine (ca. 272–337) Roman Emperor whose Edict of Milan in 313 made Christianity a tolerated religion within the Roman Empire. Under Constantine's leadership, widely diverse Christian writings and beliefs were formalized, thus facilitating the widespread acceptance of Christianity.

Cynicism The belief that the best life is one lived close to nature and away from the rules and regulations of society.

Dialectic method The technique used by Abelard in seeking truth. Questions are raised, and several possible answers to those questions are explored.

Diogenes (ca. 412–323 B.C.) Like his mentor Antisthenes, advocated natural impulse as the proper guide for action instead of social convention.

Dogmatist According to the Skeptics, any person claiming to have arrived at an indisputable truth.

Epicureanism The belief that the best life is one of long-term pleasure resulting from moderation.

Epicurus of Samos (ca. 341–270 B.C.) Founder of Epicureanism.

Hedonism The belief that the good life consists of seeking pleasure and avoiding pain.

Internal sense The internal knowledge of moral right that individuals use in evaluating their behavior and thoughts. Postulated by St. Augustine.

Introspection The examination of one's inner experiences.

Jesus (ca. 6 B.C.–A.D. 30) A simple, sensitive man who St. Paul and others claimed was the Messiah. Those who believe Jesus to be the son of God are called Christians.

Lombard, Peter (ca. 1095–1160) Insisted that God could be known through faith, reason, or the study of his work in nature.

Magnus, St. Albertus (ca. 1200–1280) Made a comprehensive review of Aristotle's work. Following Aristotle's suggestion, he also made careful, direct observations of nature.

Maimonides (1135–1204) Jewish physician and philosopher who attempted to reconcile Aristotelian philosophy and Judaism.

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Marcus Aurelius (121–180) Roman emperor and author of the *Meditations*, a seminal work of Stoic philosophy.

Mystery religions Ancient religions (cults) that were characterized by secret rites of initiation; ceremonies designed to bring initiates closer to a deity or deities, to symbolize death and rebirth, to offer purification and forgiveness of sins, and to cause the exaltation of a new life; the confession of sin; and a strong feeling of community among members.

Neoplatonism Philosophy that emphasized the most mystical aspects of Plato's philosophy. Transcendental experiences were considered the most significant type of human experience.

Nominalism The belief that so-called universals are nothing more than verbal labels or mental habits that are used to denote classes of experience.

Occam's razor The belief that of several, equally effective alternative explanations, the one that makes the fewest assumptions should be accepted.

Ontological argument for the existence of God St. Anselm's contention that if we can think of something, it must be real. Because we can think of a perfect being (God), that perfect being must exist.

Paul, St. (ca. 10–64) Founded the Christian church by claiming that Jesus was the son of God. Paul placed the soul or spirit in the highest position among the human faculties, the body in the lowest, and the mind in a position somewhere between.

Philo (ca. 25 B.C.–A.D. 50) A Neoplatonist who combined Jewish theology with Plato's philosophy. Philo differentiated between the lower self (the body) and a spiritual self, which is made in God's image. The body is the source of all evil; therefore, for the spiritual self to develop fully, one should avoid or minimize sensory experience.

Plotinus (205–270) A Neoplatonist who emphasized the importance of embracing the soul through introspection. These subjective experiences were more important and informative than physical experiences.

Predestination The belief that God has preordained, even before birth, which people will be granted salvation (the elect) and which are condemned to eternal damnation.

Pyrrho of Elis (ca. 360–270 B.C.) Founder of Skepticism.

Realism The belief that abstract universals (essences) exist and that empirical events are only manifestations of those universals.

Scholasticism The synthesis of Aristotelian philosophy with Christian teachings.

Skepticism The belief that all beliefs can be proved false; thus, to avoid the frustration of being wrong, it is best to believe nothing.

Stoicism The belief that one should live according to nature's plan and accept one's fate with indifference or, in the case of extreme hardship, with courage.

Vedantism The Indian religion that emphasized the importance of semiecstatic trances.

William of Occam (ca. 1285–1349) Denied the contention of the realists that what we experience are but manifestations of abstract principles. Instead, he sided with the nominalists who said that so-called abstract principles, or universals, were nothing more than verbal labels that we use to describe classes of experiences. For Occam, reality is what we experience directly; there is no need to assume a "higher" reality beyond our senses.

Zeno of Citium (ca. 335–263 B.C.) Founder of Stoicism.

Zoroastrianism The Persian religion that equated truth and wisdom with the brilliance of the sun and ignorance and evil with darkness.

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4

Renaissance Science and Philosophy

The **Renaissance** is generally dated from approximately 1450 to 1600. *Renaissance* means "rebirth," and during this period, the tendency was to go back to the more open-minded method of inquiry that had characterized early Greek philosophy. It was a time when Europe gradually switched from being God-centered to being human-centered. If God existed, he was manifest in nature; therefore, to study nature was to study God. Also, because God had given humans the ability to create works of art, why not exercise that ability to the fullest? The new view was that there was more to humans than their souls: They had sensory systems, so why not use them? They had reasoning powers, so why not exercise them? And they had the capacity for enjoyment, so why not enjoy? After all, God, in his infinite wisdom, must have given humans these attributes. Attention was diverted from the heavens, where the Medievals had focused it, to humans living in the world. Nowhere is this spirit of the times better illustrated than in the work of the Renaissance humanists.

CHALLENGES TO CHURCH AUTHORITY

The Renaissance and the breakdown of church authority went hand in hand. Church dogma consisted of fixed truths: there are exactly seven heavenly bodies in the solar system, the earth is the center of the universe, and humans are created in God's image, for example. Gradually, these "truths" were challenged, and each successful challenge focused suspicion on other "truths." Once begun, the questioning escalated rapidly, and the church tried desperately to discourage these challenges to its authority. Church scholars attempted to show that contradictions were only apparent. Failing in this, they attempted to impose censorship, but it was too late. Gradually, church dogma was replaced by the very thing it had opposed the most—the direct observation of nature without the intervention of theological considerations. This transition, although steady, was slow and painful.

There is no single reason for this reawakening of the spirit of objective inquiry; several factors are believed responsible. One was Aquinas's acceptance of reason and the examination of nature as ways of knowing God. Once sanctioned by the church, the human capacity to reason was focused everywhere, including on church dogma. Another factor was the work of the humanists that we will consider next. Humanist philosophy recaptured the spirit of open inquiry reflected in the Greeks, and also stressed the human potential to act upon the world and change it for the better.

In addition, two other broad events are considered key factors in the acceptance of the objective study of nature because they weakened the authority of the church. The first of these was exploration and contact with other peoples. For example:

- The explorations of central Asia and China from 1271 to 1295 by Marco Polo (ca. 1254–1324).
- Discovery of the New World by Christopher Columbus (1492).
- Circumnavigation of the globe by Ferdinand Magellan's expedition (1519–1522).

Such events vastly expanded the known world. The discovery that the earth was filled with strange peoples with strange customs created many problems for the church. For example, a long debate occurred concerning whether "savages" found in America had rational souls (it was decided that they did). The second key event was Johannes Gutenberg's (ca. 1397–1468) invention of metal moveable type (ca. 1436–1440) in the West, thus creating modern printing techniques.

The importance of printing cannot be overstated. Copying books by hand was slow work that both limited availability and stifled new thought. Obviously with limited availability, only a relatively few individuals might ever have access to a given work. Beyond that, if you were a bright young Medieval monk, which would you be more likely to painstakingly transcribe by hand—a classic work of relevance to theology, or your own ideas about some new matter of philosophy or natural science? Which would your church brethren think a better use of your time?

The advent of printing changed all that. Within just a few decades the number of books increased dramatically. Literacy grew (as did universities and even genres of writing); far more individuals had access to books, and now there was no need for a bright young mind to copy a classic work, freeing them to produce new scholarship instead. Widespread printing of the vernacular (the standard native language of a locality or country) Bible paved the way for the Reformation, and outside of theology, printing facilitated the exchange of ideas required for advancing both philosophy and science—all of which we will consider subsequently.

As an aside, we should note that Gutenberg invented printing in *the West*. Many key discoveries that would shape the Renaissance were first made in the East. We saw the importance of Islamic scholars in the reclamation of Aristotle in our last chapter, and commented that Islamic science was far ahead of Western science at that time. From the Islamic world we also get our numerals and much of our math. In China, timekeeping, navigational devices (such as the compass), both papermaking and printing, as well as explosives and gunpowder, were all long established before they reached the West.

RENAISSANCE HUMANISM

Major Themes

The term *humanism*, as it applies to the Renaissance, does not mean "humanitarianism." That is, it does not refer to a deep concern about the welfare of humans. Nor does it refer to humaneness—treating one's fellow humans with respect, sensitivity, and dignity. As it applies to the Renaissance, **humanism** denotes an intense interest in human beings, as if we were discovering ourselves for the first time. During this time, interest was focused on a wide range of human activities. How do we think, behave, and feel? Of what are we capable? These and related questions are reflected in the four major themes that characterized Renaissance humanism.

- *Individualism.* There was great concern with human potential and achievement. The belief in the power of the individual (as opposed to the church or the state) to make a positive difference in the world created a spirit of optimism.
- *Personal religion.* Although all Renaissance humanists were devout Christians, they wanted religion to be more personal and less formal and ritualistic. They argued for a religion that could be personally experienced rather than one that the church hierarchy imposed on the people.
- *Intense interest in the past.* The Renaissance humanists became enamored with the past. The works of the early Greek and Roman poets, philosophers, and politicians were of special interest. Renaissance scholars wanted to read what the ancients had really said, instead of an "official" interpretation. These activities introduced Renaissance scholars to a wide range of viewpoints from the past, and many of these views found considerable support among the humanists. For example, in 1462, **Marsilio Ficino** (1433–1499) founded a Platonic academy in Florence. He sought to do for Plato's philosophy what the Scholastics had done for Aristotle's. Among the humanists, almost every early Greek and Roman philosophy had its adherents, but Plato was especially influential. Even some extremely old Eastern religions were rediscovered, stimulating great interest in the occult.
- *Anti-Aristotelianism.* Many of the humanists believed that the church had embraced Aristotle's philosophy to too great an extent—to the point where Aristotle's philosophy was as authoritative as the Bible. Passages from Aristotle commonly settled theological disputes. To the humanists, this was ridiculous because Aristotle had been only human, and like any human, he was capable of error. To the regret of the humanists, Aristotle's philosophy, along with Christian theology, had been used to create a set of rules, regulations, and beliefs that one had to accept in order to be a Christian. Accepting church dogma became more important than one's personal relationship with God; therefore, the humanists attacked church dogma harshly. Although there were many interesting Renaissance humanists, space permits only a brief review of a few of them.

Francesco Petrarch

So influential was **Francesco Petrarch (1304–1374)** that some historians argue that his writings mark the beginning of the Renaissance. Clearly, all the themes discussed above are found in Petrarch's work. Above all, Petrarch was concerned with freeing the human spirit from the confines of medieval traditions, and the main target of his attack was Scholasticism. He believed that the classics should be studied as the works of humans and not be interpreted or embellished by others. He had a low opinion of those who used the classics to support their own beliefs, saying of these interpreters, "Like those who have no notion of architecture, they make it their profession to whitewash walls" (R. I. Watson, 1978, p. 138).

As most Renaissance humanists did, Petrarch urged for a personal religion like that described by St. Augustine—a religion based on the Bible, personal faith, and personal feelings. He thought that Scholasticism, in its attempt to make religion compatible with Aristotelian rationalism, had made it too intellectual. Petrarch also argued that a person's life in this world is at least as important as life after death. God wanted humans to use their vast capabilities, not inhibit them, Petrarch argued. By actualizing the potential God has given to us, we can change the world for the better. By focusing on human potential, Petrarch helped stimulate the explosion of artistic and literary endeavors that characterized the Renaissance.

Petrarch did not create anything new philosophically, but his challenge of religious and philosophical authority helped open the door for individuals such as Copernicus, Kepler, and Galileo. In other words, Petrarch's skepticism toward all forms of dogma helped pave the way for modern science.

Giovanni Pico

Giovanni Pico (1463–1494) argued that God had granted humans a unique position in the universe. Angels are perfect and thus have no need to change, whereas nonhuman animals are bound by their instincts and cannot change. Humans alone, being between angels and animals, are capable of change. We can choose to live sensual, instinctive lives, thereby becoming brutish, or to exercise our rationality and intelligence, thereby becoming more angelic and godlike.

Our freedom not only allows us to choose from a variety of lifestyles, but it also permits us to embrace almost any viewpoint. Pico insisted that all philosophies have common elements; for example, they reflect human rationality and individuality. He argued further that, if properly understood, the major philosophical viewpoints (for example, those of Plato and Aristotle) were essentially in agreement. All viewpoints therefore should be studied objectively with the aim of discovering what they have in common. Pico urged that all philosophical perspectives be studied and assimilated into the Christian worldview. Clearly, Pico sought peace among philosophical and religious rivals. All human works, he said, should be respected. Had Pico's plea for individuals with different viewpoints to understand each other been heeded, perhaps the Inquisition could have been averted. This was not to be, however, and only the fact that Pico died so young spared him the sight of his books being burned.

Desiderius Erasmus

Desiderius Erasmus (1466–1536) was born in Rotterdam, the illegitimate son of a priest and a physician's daughter, a fact that depressed him all of his life (Winter, 2005). He was eventually ordained a priest but had no taste for a monastic life, preferring instead a life of study, travel, and independence. While earning a living as a tutor, his travels throughout Europe brought him into contact with many leading scholars.

Erasmus was opposed to a fanatical belief in anything. He was fond of pointing out mistakes in the classics, claiming that anything created by humans could not be perfect. He challenged exorcism and alchemy as nonsense, attacking these and other forms of superstition. He begged people to take their lessons from the simple life of Jesus instead of from the pomp and circumstance of the organized church. He believed that war was caused by fanaticism, and he was especially disturbed by bishops who became rich and famous because of war. Eclectic and practical, Erasmus was a keen observer of the world and its problems. Concerning women, Erasmus had both traditional and progressive views. He commended women for their role as caregivers but argued, contrary to the prevailing view, that they should have access to education. He also argued against the idea that celibacy is superior to marriage (Rummel, 1996).

Erasmus completed his book *The Praise of Folly* (1512/1994) in 1512 while staying with his friend Sir Thomas More in England. The book caused a sensation and was reprinted 40 times during his life. In it he attacked the church and the papacy, philosophers, nobility, and superstitions of all kinds. He made the case that fools are better off than so-called wise persons because fools live in accordance with their true feelings instead of religious or philosophical doctrines. Fools, he said, are also happier because they do not fear death; they are not tormented by guilt; they do not fear ghosts, spirits, and goblins; and they are not concerned about the future. Also, like nonhuman animals, drunkards, and young children, fools are spontaneous and speak the truth. Clearly, Erasmus's philosophy had much in common with ancient Cynicism.

Erasmus was so critical of the excesses of Catholicism that the adage developed that "Erasmus laid the [Reformist] egg and Luther hatched it" (J. Wilson, 1994, p. vii). Erasmus's criticisms of the Catholic church of his day closely paralleled those of Luther:

> The pope had far too much power; the preaching of indulgences had degenerated into shameless money-making; the veneration of saints had been corrupted to superstition; church buildings were stuffed full of images; the music in services was more fitting for a wedding or a drinking party; the mass was served by priests who lived godless lives and served it as a shoemaker practices his trade; confession had become money-making and skirt-chasing; priests and monks were shameless tyrants. (Augustijn, 1991, pp. 159–160)

Perhaps in an effort to silence him, the Catholic church secretly offered to make Erasmus a cardinal (Augustijn, 1991). This having failed, all of Erasmus's works were eventually placed on the Catholic church's index of forbidden books.

Martin Luther

Martin Luther (1483–1546), an Augustinian priest and biblical scholar, was disgusted by what Christianity had become in his day. Like many other humanists, his view of Christianity was much more in accordance with St. Paul's and St. Augustine's than with those of St. Thomas Aquinas. Human intentions are inspired either by God or by Satan: the former results in doing God's work, the latter in sin. People should not be able to escape the consequences of sin through penance or absolution; if they have sinned, they should suffer the consequences, which could be eternal damnation. In the spirit of Augustinian theology, Luther insisted on an intensely personal religion in which each person is answerable only to God, a religion that deemphasized ritual and church hierarchy.

Traditionally, the **Reformation** is said to have begun in 1517 when Luther nailed his Ninety-five Theses (challenges to church dogma and hierarchy) to the door of the castle church in Wittenberg. Aside from the issues already mentioned, Luther was especially opposed to the Catholic church's sale of indulgences, which allowed sinners to reduce the retribution for their sins by paying a fee to church officials. God alone, he preached, determined what was sinful and how sinfulness was to be treated. In Luther's eyes, the church had drifted far from the teachings of Jesus and the Bible. Jesus had preached the glory of the simple life, devoid of luxury and privilege, but the church had come to value these things and to engage in too many formal rituals. For Luther, a major reason for the downfall of Catholicism was its assimilation of Aristotle's philosophy.

Luther on Marriage. Luther also disagreed with the Catholic church over the compulsory celibacy of nuns and priests. First he noted that many church leaders "lived in open liaisons with mistresses and fathered illegitimate children" and, like his contemporary Erasmus, he denounced "the lawless clergy who went whoring or kept concubines" (Marty, 2004, p. 102). Second, Luther believed that married couples are as capable of doing God's work as any nun or priest: "The mother suckling the baby and washing diapers, the farmer at work, the couple having sex were as likely to be engaged in God-pleasing activities as was any nun engaged in prayer" (Marty, 2004, p. 104). On June 13, 1525, at the age of 42, Luther married Katherina von Bora, a former nun. By 1534 the Luthers had produced six children, four of whom survived.

Luther celebrated sexual enjoyment within marriage and even entertained erotic thoughts. But what if a wife persistently denies her husband sexual satisfaction? In such a case, Luther said, perhaps surprisingly, "The husband might then turn to the household maid or someone else for sexual relations" (Marty, 2004, p. 108). Concerning a woman who wed an impotent man who, nonetheless, desires children, Luther gave this provocative advice:

> [She] with the consent of the man (who is not really her husband, but only a dweller under the same roof with her) should have intercourse with another, for example her husband's brother. They were to keep this

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> "marriage" secret and ascribe any children to the "so-called putative father." Such a woman would be in a saved state and would not be displeasing to God. (Marty, 2004, p. 108)

Luther's Denial of Free Will. Luther and Erasmus had several disagreements, but perhaps the most intense was over free will. In 1524 Erasmus wrote *The Free Will*, and in 1525 Luther responded with *The Bondage of the Will*. Erasmus defined free will as "the power of the human will whereby man can apply to or turn away from that which leads unto eternal salvation" (Winter, 2005, p. 17). Erasmus quoted numerous Biblical passages where God indicates to humans what is good and what is evil and encourages them to *choose* the former. This, he pointed out, was clearly true in the Garden of Eden, and "the entire Holy Scripture is filled with such exhortations" (Winter, 2005, p. 28).

Erasmus wrote, "Doesn't the reader of such passages ask: why do you [God] make conditional promises, when it depends solely on your will? Why do you blame me, when all my works, good or bad, are accomplished by you, and I am only your tool? … Why bless me, as if I had done my duty, when everything is your achievement? Why do you curse me, when I have merely sinned through necessity?" (Winter, 2005, p. 29). Without free will, humans cannot be held responsible for any of their actions: "Inasmuch as man can never be the author of good works, he can also never be called the author of evil ones" (Winter, 2005, p. 75). Erasmus argued that even if, contrary to what he believed, human actions are predestined that "it would be dangerous to reveal such a doctrine to the multitude, for morality is dependent on the consciousness of freedom" (Huizinga, 1924/2001, p. 163). Erasmus's solution to the apparent contradiction between predestination and free will was to combine free will and God's grace. That is, those who choose well in their lifetime are granted eternal salvation.

Contrarily, Luther said, "God … foresees, purposes and does all things according to His immutable, eternal and infallible will. This thunderbolt throws free will flat and utterly dashes it to pieces" (Winter, 2005, p. 93). Why then do humans perform evil deeds? Luther answered, "The human will is like a beast of burden. If God rides it, it wills and goes whence God wills … If Satan rides, it wills and goes where Satan wills. Nor may it choose to which rider it will run, nor which it will seek. But the riders themselves contend who shall have and hold it" (Winter, 2005, p. 97). He continued, "In all things pertaining to salvation or damnation, man has no free will, but is captive, servant and bondslave, either to the will of God, or to the will of Satan" (Winter, 2005. p. 98). Still, God is all-knowing (omniscient), all-powerful (omnipotent), and present everywhere (omnipresent), so how can He allow evil to exist?

> Of course, this seems to give the greatest offense to common sense or natural reason, that God, who is proclaimed as being so full of mercy and goodness, should of His own mere will abandon, harden and damn men, as though delighted in the sins and eternal torments of the miserable. It seems iniquitous, cruel, intolerable to think thus of God. It has given offense to so many and many great men down the ages. And who would not be offended? I myself have been offended at it more than once, even unto the deepest abyss of despair, so far that I wished I had never been made a man. (Winter, 2005, pp. 113–114)

Even with these concerns, Luther insisted, "If the foreknowledge and omnipotence of God are admitted, we must be under necessity" (Winter, 2005, p. 114). According to Luther, in the final analysis, why God allows evil to exist is unfathomable to humans and, therefore, must remain a mystery. In other words, God only knows.

Throughout his debate with Luther, Erasmus was respectful, kind, and conciliatory. For example, he conceded, "When one has arrived at this view, others at that view, both reading the same Scripture, it is due to the fact that each looked for something else and interpreted that which he read for his own purpose" (Winter, 2005, p. 68). However, Luther

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was often mean, disrespectful, and dogmatic. He insisted, for example, that his interpretation of scripture was the only correct one, and he ended the debate by praying that the Lord would enlighten Erasmus on the subject of free will. It should be noted that despite his reputation for tolerance, Erasmus, like Luther, was fiercely anti-Semitic (Marty, 2004). And, it is interesting that on the issue of free will, subsequent Lutheranism developed more in accordance with Erasmus's views than with Luther's.

When Luther was excommunicated in 1521, the protest that he represented grew into a new religious movement, **Protestantism**, and Luther was its leader. The new religion denied the authority of the pope and insisted that every individual had the right to interpret the Bible for himself or herself. To facilitate the latter, Luther translated the Bible into the German vernacular. The Catholic church's response to the criticisms of Luther and others was to make Aquinas's Christianized version of Aristotle's philosophy official church dogma, which all Christians were expected to follow. The dispute over which version of Christianity was correct soon divided Europe.

Early Protestantism had at least two negative aspects. First, as a religion, it was austere, harsh, and unforgiving. In terms of individual happiness, it is difficult to imagine its adherents being any better off than those embracing Catholicism. Second, Protestantism insisted on accepting the existence of God on faith alone; attempting to understand him through reason or empirical observations was foolish and to be avoided. Thus, if one believes that the acceptance of reason and the observation of nature as ways of knowing God exemplified progress, then Protestantism exemplified regression. On the positive side, however, Protestantism was a liberating influence in the sense that it challenged the authority of the pope and of Aristotle; replacing them was the belief that individual feelings can provide the only truth needed in living one's life.

It is interesting to note that although the portrayal of Luther is often grim, he was known to have an earthly sense of humor. For example, he once observed, "My enemies examine all that I do. If I break wind in Wittenberg they smell it in Rome" (P. Smith, 1911, p. 355). For additional information concerning Luther's colorful life, including his confrontations with Erasmus, and his influential theology, see Cary (2004).

Michel de Montaigne

With the recovery of classical knowledge, there arose a concern that had occupied the Greek and Roman Skeptics: With so many claims of truth, is there any valid way of distinguishing among them? The Skeptics answered in the negative, and we see indications of Skepticism in the works of Petrarch, Pico, and especially Erasmus. Luther demonstrated Skepticism, at least toward Aristotelian philosophy and the religious practices that developed since the time of Augustine. It is in the work of **Michel de Montaigne (1533–1592)**, however, that we find the extreme Skepticism that had been represented earlier by Pyrrho of Elis (see Chapter 3). In a series of influential essays, Montaigne questioned the very possibility of indisputable knowledge. Like Erasmus, he argued that both Catholic and Protestant theologies were equally indefensible on rational grounds and that the only justifiable basis for a religious conviction was faith.

In sharp contrast to most earlier Renaissance humanists, Montaigne did not glorify human rationality, nor did he believe humans to be superior to other animals (in this he was in agreement with Erasmus). In fact, he argued that it was human rationality that caused most human problems (such as the Holy Wars) and that because nonhuman animals lack rational powers, they are superior to humans. He analyzed the most famous philosophical doctrines, pointed out the contradictions within and among them, and showed them to be open to multiple interpretations. This is similar to what the French philosopher Jacques Derrida (1930–2004) became famous for doing many years later.

Montaigne rejected science as a means of attaining reliable knowledge because scientific "truth" is in constant flux. He even went beyond the Greek and Roman Skeptics by denying that simple sensations can act as reasonable guides for living. Sensations, he said, are often illusory, and even if they were not, they are influenced by our bodily conditions and personal histories. It should be clear that Montaigne did not share the optimism expressed by the earlier Renaissance humanists concerning the human potential to make a positive difference in the world.

Montaigne's Skepticism stimulated a number of attempts to disprove it. For example, Popkin (1967) argues that both Francis Bacon and Rene Descartes (both covered later in this chapter) responded to Montaigne's doubts concerning human knowledge by creating philosophical systems they believed were impervious to such doubt.

There were many other Renaissance humanists. Some, such as Leonardo da Vinci (1452–1519), not only manifested the power of the individual through their famous art, but also provided detailed studies of human physiology as it related to perception and behavior. Some, such as Niccolo Machiavelli (1469–1527), are more associated with politics. Although Machiavelli's classic work on interpersonal manipulation, *The Prince*, can still be read as a masterpiece of social psychology. Some, such as Juan Luis Vives (1492–1540), are best known for their impact on pedagogy. Advocating an educational system and an understanding of human nature based on physiology, Clements (1967) has suggested Vives as the first true psychologist. And some, such as William Shakespeare (1564–1616), we know for their contributions to literature that continue to illuminate our understanding of the human condition. In all these cases, the emphasis was the same—the power of the individual to change things for the better rather than simply accepting the world as it was.

To say the least, the Renaissance was a paradoxical time. On one hand, there was an explosion of interest in human potential coupled with great human achievements. In this respect, the Renaissance resembled classical Greece. On the other hand, it was a time of persecution, superstition, witch hunting and execution, fear, torture, and exorcism. Although astrologers and alchemists were generally highly regarded and popular, abnormal individuals were often treated with extreme harshness. Wars destroyed much of France and Germany, the Black Death cut Europe's population by about a third, major famines occurred, and syphilis was epidemic. Yet despite all this trouble, there was almost unparalleled creativity. The Renaissance displayed the best and worst of humanity—the stuff from which modern philosophy, and science, emerged.

PTOLEMY, COPERNICUS, KEPLER, AND GALILEO

Ptolemy

In the second century A.D., **Ptolemy**, a Greco-Egyptian, summarized the mathematical and observational astronomy of his time and that of antiquity in his *Almagest*. The **Ptolemaic system** included the beliefs that the heavenly bodies, including the earth, were spherical in shape and that the sun, moon, and planets travel around the earth in orbits that are circular and uniform. Although this system reflected the views of most astronomers, including those of Aristotle, there were exceptions. A notable exception was **Aristarchus of Samos (ca. 310–230 B.C.)**, the brilliant astronomer of the Alexandrian school. Aristarchus believed that the earth rotated on its own axis and that the earth and the other planets revolved around the sun. In other words, Aristarchus arrived at the basic assumptions of the Copernican system about 1,700 years before Copernicus. Despite a few such dissenters, the view of the universe reflected in the Ptolemaic system prevailed until the 17th century. The Ptolemaic system was resilient for at least three reasons (Taub, 1993):

- It accorded well with the testimony of the senses (the earth does appear to be the fixed center of the universe).
- It allowed reasonable astronomical predictions.
- Later, it was congenial to Christian theology because it gave humans a central place in the universe and thus was in agreement with the biblical account of creation.

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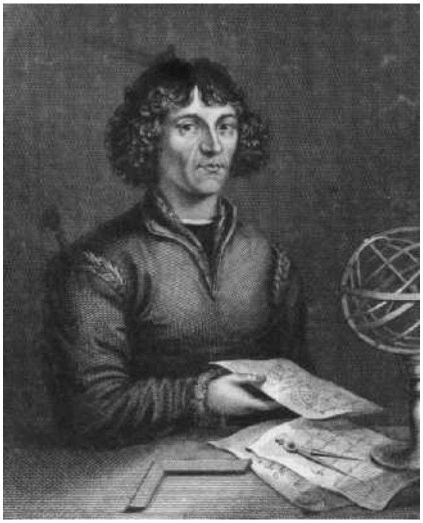
In medieval theology, many of the teachings of Ptolemy, like those of Aristotle, became part of official church dogma and were therefore unchallengeable. The worldview based on the Ptolemaic system became entrenched in philosophy, theology, science, and everyday life.

Nicolaus Copernicus

It was not until a devout canon of the Roman Catholic church named **Nicolaus Copernicus (1473–1543)**, born in Torun, Poland, published his book *De Revolutionibus Orbium Coelestium (The Revolutions of the Heavenly Spheres)* that the Ptolemaic system was seriously challenged. Although reports on Copernicus's heliocentric theory had been circulating since about 1515, his *De Revolutionibus* was not published until 1543, the year he died. The book was dedicated to "the most holy lord, Pope Paul III" and promised to solve a major problem with which the church had been struggling; namely, the creation of a more accurate calendar. The book, then, did not *appear* to be unfriendly toward the church. Furthermore, when *De Revolutionibus* was published, its contents could be understood only by the most sophisticated mathematicians and astronomers of the day. Perhaps because of its apparent compatibility with church dogma and its esoteric nature, the book was not immediately viewed as a threat by the church (although it was eventually condemned).



Nicolaus Copernicus

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In any case, in *De Revolutionibus*, Copernicus did argue successfully that, rather than the sun revolving around the earth (the **geocentric theory**), the earth revolved around the sun (the **heliocentric theory**). This argument, of course, was a clear contradiction of church dogma. Only gradually was it realized that Copernicus's heliocentric theory questioned the traditional place of humankind in the universe. Once this realization occurred, a number of related questions followed: Were we favored by God and therefore placed in the center of the universe? If not, why not? If the church was wrong about this vital fact, was it wrong about other things? Were there other solar systems that contained life? If so, how were they related to ours, and which did God favor? Because Copernicus's heliocentric theory challenged a deeply held worldview going back at least to Aristotle, it was considered revolutionary (Kuhn, 1957). Common sense dictated the acceptance of the geocentric theory, and those rejecting it were considered either misinformed or insane. Within the church, to challenge the geocentric theory was to challenge church dogma and was therefore heretical.

Giordano Bruno (1548–1600) was a former Dominican priest who developed an interest in the ancient philosophy of Hermetism. Among other things, Hermetics professed the divinity of humans, the existence of magical forces that can be used to benefit humankind, and a harmony among humans, stars, and planets. The Hermetic tradition also held that in the universe there are innumerable inhabited worlds (that is, solar systems) and in each of these worlds, including our own, the sun is divine. For Bruno, "The Copernican sun heralds the full sunrise of the ancient and true philosophy after its agelong burial in dark caverns" (Yates, 1964, p. 238). Bruno, therefore, accepted Copernicus's heliocentric theory not so much for scientific reasons but because it restored the divine status given to the sun by the ancients. All of this was too much for the church, and Bruno was brought before the

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Inquisition in Venice on May 26, 1592, and charged with eight counts of heresy. At first he recanted his beliefs and asked for mercy from the judge, but later he changed his mind, arguing that he had never been a heretic. Eight years after his imprisonment, Bruno was convicted as a relapsed heretic and on February 17, 1600, was burned at the stake. It should not be concluded, however, that Bruno was a martyr for science. In the charges brought against him, Copernicus was not even mentioned (M. B. Hall, 1994).

Often the reformers were as violent as those they were attempting to reform. For example, the Protestant John Calvin ordered the famous anatomist Michael Servetus (1511–1553) to be burned at the stake because he "described the Holy Land as a barren wilderness" (which it was), thus contradicting the scriptural description of it as a land of "milk and honey." The fate of individuals like Bruno and Servetus helps explain the caution exhibited by scientists and philosophers during these times.

Copernicus was aware that Aristarchus had proposed a theory very similar to his many centuries before and took some comfort in knowing this. Nonetheless, he realized that the heliocentric theory was nothing short of revolutionary, and he was justifiably worried. Furthermore, Copernicus knew that despite the theological and philosophical turmoil caused by his theory, *nothing in terms of scientific accuracy was gained by it*. That is, the astrological predictions made by his theory were no more accurate than the ones made under the Ptolemaic system. Also, all known celestial phenomena could be accounted for by the Ptolemaic system; there were no major mysteries that needed explanation. The *only* justification for accepting Copernicus's heliocentric theory was that it cast the known astrological facts into a simpler, more harmonious mathematical order.

In the Ptolemaic system, it was necessary to make a number of complex assumptions concerning the paths of the planets around the earth. Once these assumptions were made, however, predictions concerning the paths of the planets and eclipses of the sun and moon could be made with considerable accuracy. What Copernicus's system did was to reduce the number of assumptions needed to make those same predictions. As we have seen, a strong resurgence of interest in Platonic philosophy arose in the 15th and 16th centuries, and the Pythagorean aspect of Platonism was stressed during this revival. Working in favor of accepting the Copernican viewpoint was the Pythagorean-Platonic view that the universe operated according to mathematical principles and that those principles are always the simplest and most harmonious possible. It is no accident that the first to accept Copernicus's theory were mathematicians who, like himself, embraced the Pythagorean-Platonic worldview.

We have in the Ptolemaic-Copernican debate the first scientific revolution, to use Kuhn's (1957, 1996) terminology. The Ptolemaic system represented the accepted scientific paradigm of the day. Like any paradigm, it defined problems, specified solutions, and provided those accepting it with a worldview. The Copernican paradigm focused on different problems, different methods of solution, and a distinctly different worldview. Because to follow Copernicus was to reject the prevailing view of the universe, the opposition to his view was widespread and harsh.

Converts to Copernicus's heliocentric theory came slowly. Among the first was Johannes Kepler, a Pythagorean-Platonic mathematician.

Johannes Kepler

Johannes Kepler (1571–1630) was born at Weil, in the Duchy of Wurttemberg, in what is now Germany. He first studied to become a Lutheran minister but, unable to accept the rigidity of Lutheran doctrine, switched to the study of mathematics and astronomy. Kepler was fortunate to have a teacher, Michael Maestlin, who encouraged a critical evaluation of both Ptolemaic and Copernican astronomy in spite of the fact that Luther had condemned the heliocentric theory as a flagrant contradiction of biblical teachings. For example, Luther said, "The fool will turn the whole science of astronomy upside down. But as Holy Writ declares, it was the Sun and not the earth which Joshua commanded to stand still" (M. B. Hall, 1994, p. 126).

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Other Protestant leaders joined in the rejection of Copernicus. Calvin cited the opening verse of the 93rd Psalm—"The earth is established, it shall never be moved,"—and asked, "Who will venture to place the authority of Copernicus above that of the Holy Spirit?" (Kuhn, 1957, p. 192). Thus, there was risk in embracing Copernican theory even for a Protestant, but embrace it is what Kepler did. There appear to be two reasons Kepler took the risk. First, he, like Copernicus, was a Platonist seeking the simple mathematical harmony that describes the universe. Second, like Bruno, Kepler saw the sun as a mystical force and, as such, he was attracted to the greater dignity given to the sun in the Copernican system. Throughout his life, when he gave his reasons for accepting Copernican theory, the enhanced position given the sun by that theory was always cited, and it was usually cited first. In keeping with his Pythagorean-Platonic philosophy, Kepler believed that *true* reality was the mathematical harmony that existed beyond the world of appearance. The sensory world, the world of appearance, was an inferior reflection of the certain, unchanging mathematical world.

Armed with a mixture of Platonic philosophy, mysticism, and Copernican theory, Kepler not only made a living as an astrologer (he believed the heavenly bodies affect human destiny) but also made significant contributions to astronomy. He worked out and proved many of the mathematical details of the Copernican system, thereby winning its further acceptance. Through mathematical deduction and observation, he found that the paths of the planets around the sun were elliptical rather than circular (as Copernicus had believed). He observed that the velocities of the planets vary inversely with their distance from the sun, thus anticipating Newton's concept of gravitation. Finally, he demonstrated that all the different planetary motions could be described by a single mathematical statement. Perhaps Kepler's most important contribution to science, however, was his insistence that all mathematical deductions be verified by empirical observation.

Kepler also studied vision directly and found that environmental objects project an inverted image onto the retina. This observation contrasted with earlier theories that explained vision as the result of the projection of exact copies of objects directly into the sense receptors. Kepler also questioned humans' ability to perceive things correctly when the image projected onto the retina is upside down, but he left that problem for others to solve.

Galileo

Galileo Galilei (1564–1642), known simply as **Galileo**, was born at Pisa, Italy, into a family of impoverished nobility. He was a brilliant mathematician who, at the age of 25, was appointed professor of mathematics at the University of Pisa. Like Copernicus and Kepler, Galileo viewed the universe as a perfect machine whose workings could be understood only in mathematical terms:

> Philosophy is written in that great book which ever lies before our eyes—I mean the universe—but we cannot understand it if we do not first learn the language and grasp the symbols in which it is written. This book is written in the mathematical language, and the symbols are triangles, circles, and other geometric figures, without whose help it is impossible to comprehend a single word of it; without which one wanders in vain through a dark labyrinth. (Burtt, 1932, p. 75)

Also like Copernicus and Kepler, Galileo saw his task as explaining the true mathematical reality that existed beyond the world of appearances. Armed with these Pythagorean-Platonic beliefs, Galileo set out to correct a number of misconceptions about the world and about heavenly bodies. He challenged Aristotle's contention that heavy objects fall faster than lighter ones because of their inherent tendency to do so by *demonstrating* that both fall at the same rate. He accepted the Copernican heliocentric theory and wrote a book in which he demolished all arguments against it. In 1609, Galileo used his modified version of the newly invented telescope to discover the mountains of the moon, sunspots, and the fact that the Milky

Way is made up of many stars not visible to the naked eye. He also discovered four moons of Jupiter, which meant that there were at least 11 bodies in the solar system instead of 7, as claimed by the church.

Most people refused to look through Galileo's telescope because they believed that to do so was an act of heresy. Galileo shared one such experience with his friend Kepler:

> Oh, my dear Kepler, how I wish that we could have one hearty laugh together! Here at Padua is the principal professor of philosophy, whom I have repeatedly and urgently requested to look at the moon and planets through my glass, which he perniciously refuses to do. Why are you not here? What shouts of laughter we should have at this glorious folly! And to hear the professor of philosophy at Pisa laboring before the Grand Duke with logical arguments, as if with magical incantations, to charm the new planets out of the sky. (Burtt, 1932, p. 77)

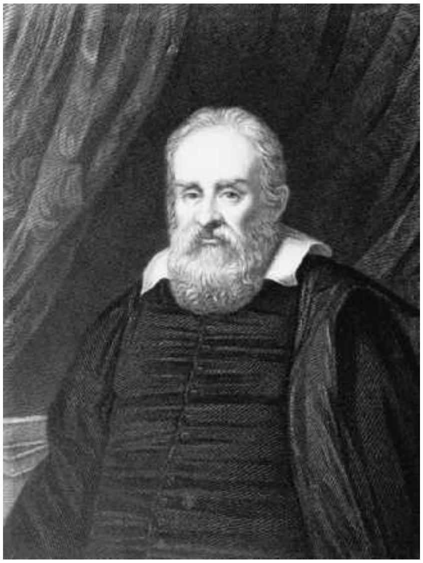
Others refusing to look through Galileo's telescope asserted "that if God meant man to use such a contrivance in acquiring knowledge, He would have endowed men with telescopic eyes" (Kuhn, 1957, p. 226). And still, others who did look through the telescope acknowledged the phenomena observed "but claimed that the new objects were not in the sky at all; they were apparitions caused by the telescope itself" (Kuhn, 1957, p. 226).

With his studies of the dynamics of projectiles, Galileo demonstrated that the motions of all bodies under all circumstances are governed by a single set of mathematical laws. His studies showed that notions of "animation" were unnecessary for explaining physical events. That is, because the behavior of objects and events can be explained in terms of external forces, there is no need to postulate "natural places," "passions," "ends," "essences," or any other inherent properties.

Before Galileo's time, much had been written on the subject of motion, but no one had actually measured the motions of falling bodies:

> When Galileo was born, two thousand years of physics had not resulted in even rough measurements of actual motions. It is a striking fact that the history of each science shows continuity back to its first use of measurement, before which it exhibits no ancestry but metaphysics. That explains why Galileo's science was stoutly opposed by nearly every philosopher of his time, he having made it as nearly free from metaphysics as he could. That was achieved by measurements, made as precisely as possible with the means available to Galileo or that he managed to devise. (Drake, 1994, p. 233)

However, in his attitude toward experimentation, we again see Galileo's Pythagorean-Platonic beliefs. For Galileo, discovering a physical law was like discovering a Platonic form. Observation suggests that a lawful relationship may exist, and an experiment is performed to either confirm or disconfirm the possibility. Once a law is discovered, however, further experimentation is not necessary; mathematical deduction is used to precisely describe all possible manifestations of the law. Galileo



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Galileo

believed that, besides being useful in verifying the existence of laws, experiments could also function as demonstrations that help convince those skeptical about the existence of certain laws. Galileo, then, relied much more on rational deduction than he did on experimentation. On the question of realism versus nominalism, he was clearly on the side of realism. Actual laws (forms) existed, and those laws acted on the physical world. Like a true Platonist, Galileo said that the senses can provide only a hint about the nature of reality. The ultimate explanation of reality must be in terms of the rational order of things; that is, the ultimate explanation must be mathematical. Pythagoras would have been pleased.

Objective and Subjective Reality. Galileo made a sharp distinction between objective and subjective reality. Objective reality exists independently of anyone's perception of it, and its attributes are what later in history were called **primary qualities**. Primary qualities are absolute, objective, immutable, and capable of precise mathematical description. They include quantity, shape, size, position, and motion or rest. Besides the primary qualities (which constitute physical reality), another type of reality is created by the sensing organism; this reality consists of what came to be called **secondary qualities**. Secondary qualities (which constitute subjective reality) are purely psychological experiences and have no counterparts in the physical world. Examples of secondary qualities include the experiences of color, sound, temperature, smell, and taste. According to Galileo, secondary qualities are relative, subjective, and fluctuating. Of primary qualities (like Plato's forms), we can have true knowledge; of secondary qualities, there is only opinion and appearance.

Although secondary qualities may seem as real as primary qualities, they are not. Primary qualities are real, but secondary qualities are merely names we use to describe our subjective (psychological) experiences:

> Hence I think that these tastes, odours, colours, etc., on the side of the object in which they seem to exist, are nothing else than mere names, but hold their residence solely in the sensitive body; so that if the animal were removed, every such quality would be abolished and annihilated. Nevertheless, as soon as we have imposed names on them … we induce ourselves to believe that they also exist just as truly and really as the [primary qualities]. (Burtt, 1932, p. 85)

In studying the physical world, secondary qualities are, at best, irrelevant. If one physical object hits another, the color, smell, or taste of the objects is irrelevant in determining their subsequent paths. For Galileo, it was physical reality, not subjective reality, that could be and should be studied scientifically.

The Impossibility of a Science of Conscious Experience. Because so much of our conscious experience consists of secondary qualities, and because such qualities can never be described and understood mathematically, Galileo believed that consciousness could never be studied by the objective methods of science. Galileo's position marked a major philosophical shift concerning man's place in the world. Almost without exception, all philosophers and theologians prior to Galileo gave humans a prominent position in the world. If there were good things and bad things in the world and if there were changing and unchanging things in the world, those things also existed in humans. Humans were viewed as a microcosm that reflected the vast macrocosm: "Till the time of Galileo it had always been taken for granted that man and nature were both integral parts of a larger whole, in which man's place was the more fundamental" (Burtt, 1932, p. 89). With Galileo, this view of humans changed. Those experiences that are most human—our pleasures; our disappointments; our passions; our ambitions; our visual, auditory, and olfactory experiences—were now considered inferior to the real world outside of human experience.

At best, humans can come to know the world of astronomy and the world of resting and moving terrestrial objects (physics). However, this knowledge

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can never be attained by sensory experience alone. It can be attained only by rationally grasping the mathematical laws that exist beyond sensory experience. For the first time in history, we have a view of human conscious experience as secondary, unreal, and totally dependent on the senses, which are deceitful. What is real, important, and dignified was the world outside of man: "Man begins to appear for the first time in the history of thought as an irrelevant spectator and insignificant effect of the great mathematical system which is the substance of reality" (Burtt, 1932, p. 90).

Thus, Galileo excluded from science much of what is now included in psychology and many modern natural scientists refuse to accept psychology as a science for the same reason that Galileo did not accept it. There have been many efforts to quantify cognitive experience since the time of Galileo, and insofar as these efforts have been successful, Galileo's conclusions about the measurement of secondary qualities were incorrect. How successful these efforts have been, however, has been and is widely disputed.

As we have seen, Aristotle was Galileo's prime target. Using empirical observation and mathematical reasoning, Galileo discredited one Aristotelian "truth" after another, thus attacking the very core of church dogma. At the age of 70, crippled by rheumatism and almost blind, Galileo was brought before the Inquisition and made to recant his scientific conclusions. He lived his remaining years under house arrest and, although his works had been condemned, he continued to write in secret. Galileo died on January 9, 1642. It was not until October 31, 1992, that the Catholic church officially absolved Galileo of his "transgressions" (Reston, 1994).

With the work of Copernicus, Kepler, and Galileo, the old materialistic view of Democritus was resurrected. The universe appeared to consist of matter whose motion was determined by forces external to it. God had become minimally important in the scheme of things, and now even the place of man was seriously questioned. Are humans part of the natural world? If so, they should be explicable in terms of natural science. Or is there something special about humans that sets them apart from the natural world? If so, how are humans special, and what special laws govern human behavior? The new science favored the view of humans as natural phenomena. Newton's epic-making accomplishments furthered the materialistic view of the universe and encouraged the generalization of that view to humans. Soon the universe and everything in it would be viewed as materialistic and machine-like, including people.

ISAAC NEWTON

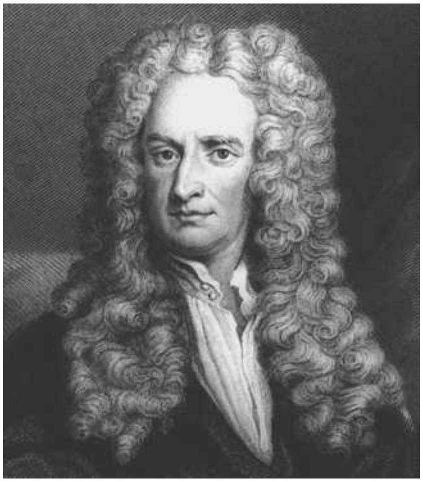
Isaac Newton (1642–1727) was born on December 25 the year Galileo died, in the village of Woolsthorpe, England. His father died before Newton's birth and, when his mother remarried, he was sent to live with his maternal grandmother in a neighboring town. In school, Newton was a mediocre student but showed great aptitude for building mechanical contrivances such as windmills and water clocks. When her second husband died, Newton's mother removed him from school and brought him back to Woolsthorpe hoping he would become a farmer. Recognizing his potential, one of Newton's teachers prevailed upon his mother to prepare Newton for entrance into Cambridge University. Newton entered Trinity College, Cambridge, in 1661 under the tutelage of Isaac Barrow, professor of mathematics, and obtained his degree four years later. Newton's greatest work, *The Mathematical Principles of Natural Philosophy* (1687/1995), was written in 18 months and was immediately hailed as a masterpiece. Newton was well aware of the fact that he benefited from the work of those who preceded him and said, "If I have seen further it is by standing on the shoulders of giants." In Newton's case, those giants included Copernicus, Kepler, and Galileo.

In 1703, Newton was elected the president of the Royal Society, and in 1705 he was knighted by Queen Anne. He was also twice a member of parliament. It is interesting to note that with all his accomplishments, Newton cited his lifelong celibacy as his greatest achievement (D. N. Robinson, 1997). Also, although we remember Newton most for his scientific achievements, he wrote much more about theology and alchemy than about science (Honderich, 1995). For Newton, however, the three topics were inseparable.

Like Galileo, Newton conceived of the universe as a complex, lawful machine created by God. Guided by these conceptions, Newton developed differential and integral calculus (Leibniz made the same discovery independently), developed the universal law of gravitation, and did pioneering work in optics. Newton created a conception of the universe that was to prevail in physics and astronomy for more than two centuries, until Einstein revised it. His methods of verification, like those of Galileo, included observation, mathematical deduction, and experimentation. In Newton, who was deeply religious, we have a complete reversal of the earlier faith-oriented way of knowing God: Because God made the universe, studying it objectively was a way of understanding God. In this he agreed with most of the Scholastics and with Copernicus and Kepler.

Although Newton believed in God as the creator of the universe, Newton's work greatly diminished God's influence. God created the universe and set it in motion, but that exhausted his involvement. After Newton, it was but a short step to removing God altogether. Soon **deism**, the belief that God created the universe but then "let it be," became popular. For the deist, the design of the universe was God's work, but revelation, religious dogma, prayer, and all forms of supernatural commerce with God were considered fruitless (Blackburn, 1994). Similarly, it was only a matter of time before humans, too, would be viewed and analyzed as just another machine that operated in accordance with the Newtonian principles of physics.

Perhaps Newton's most significant contribution was his universal law of gravitation. This law synthesized a number of previous findings, such as Kepler's observation that planetary motion is elliptical and Galileo's measurements of the acceleration of falling bodies. According to the law of gravitation, *all* objects in the universe attract each other. The amount of attraction is directly proportional to the product of the masses of the bodies and inversely proportional to the square of the distance between them. This single law was able to explain the motion of all physical bodies everywhere in the universe. Although the universe was a machine that God had created, it operated according to principles that humans could discover, and Newton found that these principles could be expressed precisely in mathematical terms—thus his (very Pythagorean) conclusion that "God was a mathematician."



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Isaac Newton

Principles of Newtonian Science

The powerful and highly influential principles of Newtonian science can be summarized as follows:

- Although God is the creator of the world, he does not actively intervene in the events of the world (deism). It is therefore inappropriate to invoke his will as an explanation of any particular thing or event in the material world.
- The material world is governed by natural laws, and there are no exceptions to these laws.
- There is no place for purpose in natural law, and therefore Aristotle's final causes must be rejected. In other words, natural events can never be explained by postulating properties inherent in them. Bodies fall, for example, not

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because of an inherent tendency to fall, but because of various forces acting on them. That is, as a Newtonian scientist, one must not invoke teleological explanations.

- Occam's razor is to be accepted. Explanations must always be as simple as possible. In Book III of his *Principles* (1687/1995), Newton gives this advice: "We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances" (p. 320). This is the same principle that led Copernicus and many of his fellow mathematicians to reject the geocentric system in favor of the heliocentric system. Because with God, the simplest is always the best, so too should it be with mathematicians and scientists. Newton's conception of the universe could not have been simpler. Everything that happens can be explained in terms of (1) space, consisting of points; (2) time, consisting of moments; (3) matter, existing in space and possessing mass; and (4) force, that which provides change in the motion of matter. Newton and his followers believed that the entire physical universe could be explained in terms of these four constructs. In fact, an explanation of any natural event meant restating it mathematically in terms of space, time, matter, and force.
- Natural laws are absolute, but at any given time our understanding is imperfect. Therefore, scientists often need to settle for probabilities rather than certainty. This is because of human ignorance, not because of any variance in natural laws.
- Classification is not explanation. To note that chasing cats seems to be a characteristic of dogs does not explain *why* dogs tend to chase cats. To understand why anything acts as it does, it is necessary to know the physical attributes of the object being acted on (such as its mass) and the nature of the forces acting on it. Again, no purpose of any type can be attributed to either the object or to the forces acting on it.

The success of Copernicus, Kepler, Galileo, and Newton with empirical observation and mathematical deduction stimulated scholars in all fields and launched a spirit of curiosity and experimentation that has persisted in the Western world until the present. Similarly, the success that resulted from viewing the universe as a machine was to have profound implications for psychology. Science had become a proven way of unlocking nature's secrets, and it was embraced with intense enthusiasm. In many ways, science was becoming the new religion:

> For centuries the Church had been impressing on man the limitations of his own wisdom. The mind of God is unfathomable. God works in a mysterious way his wonders to perform. Man must be content with partial understanding; the rest he must simply believe. For a Galileo or a Newton such a restriction of human curiosity was unacceptable. The scientist was willing to concede that some things may be ultimately unintelligible except on the basis of faith; but as he stubbornly continued to observe, measure and experiment, he discovered that more and more of the puzzles of nature were becoming clear. He was actually explaining in natural terms phenomena that had hitherto been unintelligible. Small wonder, then, that the new science began to generate a faith that ultimately science would displace theology. There is little evidence that in the sixteenth and seventeenth centuries such a faith was more than a dim hope. Nevertheless the seeds had been sown; scientists were uncovering more and more of the secrets of nature; and more and more explanations were now being given "without benefit of clergy." (MacLeod, 1975, p. 105)

FRANCIS BACON

Francis Bacon (1561–1626) was born into a distinguished political family in London. After studying three years at Cambridge, he moved to France, where he worked for an ambassador. He returned

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to England to practice law, and in 1584 he was elected to parliament. Shortly after publication of his most influential work, *Novum Organum (New Method)* (1620/1994), he was impeached by parliament for accepting bribes. He was levied a heavy fine (which he never paid) and served a brief prison sentence (four days) in the Tower of London. His forced retirement from legal and legislative matters, at 60 years of age, allowed him to concentrate on science and philosophy, and a number of significant books soon followed.

Bacon has traditionally been listed as the main spokesman for the new science in its revolt against past authorities, especially Aristotle. His sharp wit and brilliant writing style have even tempted some to speculate that he was the true author of the Shakespearean plays. He was a contemporary of Galileo, followed Copernicus by almost 100 years, and was 35 years older than Descartes (whom we will consider next). Bacon was a radical empiricist who believed that nature could only be understood by studying it directly and objectively. Accounts of how nature *should be* based on scripture, faith, or any philosophical or theological authority would only hamper one's efforts to learn how the world actually functions. Bacon authored the following satirical story, which clearly demonstrates his own positivistic approach and his disdain for authority:

> In the year of our Lord 1432, there arose a grievous quarrel among the brethren over the number of teeth in the mouth of a horse. For 13 days the disputation raged without ceasing. All the ancient books and chronicles were fetched out, and a wonderful and ponderous erudition, such as was never before heard of in this region, was made manifest. At the beginning of the 14th day, a youthful friar of goodly bearing asked his learned superiors for permission to add a word, and straightway, to the wonderment of the disputants, whose deep wisdom he sore vexed, he beseeched them to unbend in a manner coarse and unheard-of, and to look in the open mouth of a horse and find answer to their questionings. At this, their dignity being grievously hurt, they waxed exceedingly wroth and joining in a mighty uproar, they flew upon him and smote his hip and thigh, and cast him out forthwith. For, said they, surely Satan hath tempted this bold neophyte to declare unholy and unheard-of ways of finding truth contrary to all the teachings of the fathers. After many days of grievous strife the dove of peace sat on the assembly, and they as one man, declaring the problem to be an everlasting mystery because of a grievous dearth of historical and theological evidence thereof, so ordered the same writ down. (Baars, 1986, p. 19)

Baconian Science

Although Bacon and Galileo were contemporaries, their approaches to science were very different. Galileo sought general principles (laws) that could be expressed mathematically and from which deductions could be made, an approach that actually required very little experimentation. For Galileo, discovering the laws that governed the physical world was important. Once such laws had been isolated and expressed mathematically, a large number of manifestations of those laws could be deduced (**deduction** involves predicting a particular event from a general principle); Bacon, on the other hand, demanded science based on **induction**. According to Bacon, science should include no theories, no hypotheses, no mathematics, and no deductions but should involve only the facts of observation. He believed that anyone doing research with preconceived notions would tend to see nature in light of those preconceptions. In other words, Bacon thought that accepting a theory was likely to bias one's observations, and he offered Aristotle as an example of a biased researcher. Bacon said that because Aristotle had assumed that the objects in nature were governed by final causes, his research confirmed the existence of final causes:

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"[Bacon] declared that when we assume 'final causes' and apply them to science, we are carrying into nature what exists only in our imagination. Instead of understanding *things*, we dispute about *words*, which each man interprets to suit himself" (Esper, 1964, p. 290).

Bacon distrusted rationalism because of its emphasis on words, and he distrusted mathematics because of its emphasis on symbols: He said, "Words are but the images of matter.… To fall in love with them is [like falling] in love with a picture" (1605/1878, p. 120). Bacon trusted only the direct observation and recording of nature. With his radical empiricism, Bacon made it clear that the ultimate authority in science was to be observation. No authority, no theory, no words, no mathematical formulation, no belief, and no fantasy could displace empirical observation as the basis of factual knowledge. Later in history, Bacon's approach to science would be called **positivism**.

But Bacon did not avoid classifying empirical observations. He believed that after many observations, generalizations could be made, and similarities and differences among observations noted. These generalizations could be used to describe classes of events or experiences. In Baconian science, one proceeds from observation to generalization (induction); in Galilean and Newtonian science, one proceeds from a general law to the prediction of specific, empirical events (deduction). Bacon did not deny the importance of the rational powers of the mind, but he believed that those powers should be used to understand the facts of nature rather than the figments of the human imagination. What Bacon (1620/1994) ultimately proposed was a position intermediate between traditional empiricism (simply fact gathering) and rationalism (the creation of abstract principles):

> Empiricists, like ants, merely collect things and use them. The Rationalists, like spiders, spin webs out of themselves. The middle way is that of the bee, which gathers its material from the flowers of the garden and field, but then transforms and digests it by a power of its own. And the true business of philosophy is much the same, for it does not rely only or chiefly on the powers of the mind, nor does it store the material supplied by natural history and practical experiments untouched in its memory, but lays it up in the understanding changed and refined. Thus from a closer and purer alliance of the two faculties—the experimental and the rational, such as has never yet been made—we have good reason for hope. (p. 105)

Courtesy of the National Library of Medicine

Francis Bacon

According to Bacon, scientists should follow two cardinal rules: "One, to lay aside received opinions and notions, and the other, to restrain the mind for a time from the highest generalizations" (1620/1994, p. 132). Again, Bacon was not against generalization, only premature generalization.

Bacon (1620/1994) summarized the four sources of error that he believed could creep into scientific investigation in his famous "idols":

- The **idols of the cave** are personal biases that arise from a person's intellectual endowment, experiences, education, and feelings. Any of these things can influence how an individual perceives and interprets the world. Imagine how the stereotypical hungry cowboy and a vegetarian might each react to the prospect of seeing beef ribs served at a luncheon.

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- The **idols of the tribe** are biases due to human nature. All humans have in common the abilities to imagine, to will, and to hope, and these human attributes can and usually do distort perceptions. For example, it is common for people to see events as they would like them to be rather than how they really are. The modern philosopher Ludwig Wittgenstein (Chapter 20) called these innate filters upon our judgments our "form of life," and famously quipped that "If a lion could speak, we could not understand him" because the experiences of the lion would be filtered by a nonhuman form of life.
- The **idols of the marketplace** are biases that result from being overly influenced by the meaning assigned to words. Verbal labels and descriptions can influence one's understanding of the world and distort one's observations of it. Bacon believed that many philosophical disputes were over the definitions of words rather than over the nature of reality. Might you feel differently about some position if you learn it is backed by either the Democrats or the Republicans? Or, as Shakespeare's Juliet says of her Romeo—who she should not love just because he is a Montague—"What's in a name? That which we call a rose by any other name would smell as sweet."
- The **idols of the theater** are biases that result from blind allegiance to any viewpoint, whether it be philosophical or theological. An excellent demonstration of this was conducted by two American psychologists, Albert Hastorf and Hadley Cantril in 1954. Students were asked to watch a clip of the Princeton-Dartmouth football game, and then answer questions about its rough play. What they reported seeing—a hard fought game or an unnecessarily dirty event—was highly correlated with which school they attended.

Science Should Provide Useful Information

Bacon also thought that science could and should change the world for the better. Science would furnish the knowledge that would improve technology, and improved technology would improve the world. As evidence for the power of technical knowledge, Bacon (1620/1994) offered the inventions of printing, gunpowder, and the magnetic compass:

> These three [inventions] have changed the whole face and condition of things throughout the world, in literature, in warfare and in navigation. From them innumerable changes followed, so much so, that no empire, no sect, no star has been seen to exert more power and influence over the affairs of men than have these mechanical discoveries. (p. 131)

The practical knowledge furnished by science was so important for the betterment of society that Bacon believed that scientific activity should be generously supported by public funds. With his interest in practical knowledge, it is interesting that Bacon died on April 9, 1629, following complications from a chill he experienced after stuffing a chicken with snow in order to test the effect of cold temperatures on the preservation of meat (Bowen, 1993, p. 225).

Although Bacon believed that science should always be judged by its practical consequences, he also believed that "human knowledge and human power come to the same thing, for where the cause is not known the effect cannot be produced. We can only command Nature by obeying her" (1620/1994, p. 43). Thus, Bacon reached his celebrated conclusion, "Knowledge … is power" (Urbach, 1987, p. 59). For Bacon, then, understanding nature precedes any attempt to command it. By "understanding nature," Bacon meant knowing how things are causally related; once these relationships are known, their practical implications could be explored. Bacon, then, proposed two different types of experiments: *experimenta lucifera* (experiments of light) designed to discover causal relationships, and *experimenta fructifera* (experiments of fruit) designed to explore how the laws of nature might be utilized. Whether it involved experiments of light or fruit, Bacon's approach to science was

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inductive; in both cases, one needed to guard against the idols. Experiments will yield nature's secrets and provide practical information only if they are performed correctly. For Bacon, this meant in an *unbiased manner.*

Bacon was ahead of his time in insisting that scientists purge their minds of their biases. He was observing that scientists are human too, and, as with anyone else, their preconceptions can influence their observations. Kuhn (1996) points out the same thing with his concept of paradigm; currently, it is generally agreed that the observations of all scientists (or anyone else) are "theory-laden." That is, one's theory influences what one observes and how one interprets what one observes.

History has shown that Bacon's inductive approach to science was largely ignored and that the deductive approach of Galileo and Newton was highly influential. Contrary to what Bacon believed, productive science required bold theory and hypothesis testing. It is not bad to have hunches or even beliefs about how things are; what *is* bad is not modifying those hunches or beliefs if the data require it. Popper noted that important scientific discoveries never come from induction, as Bacon had believed: "Bold ideas, unjustified anticipations, and speculative thought, are our only means for interpreting nature … our only instrument for grasping her.… [The] experiment is planned action in which every step is guided by theory" (Popper, 1935/2002b, p. 280).

Most scientists since the time of Bacon have rejected his extreme reliance on the method of induction, but not all. In psychology, Skinner and his followers (see Chapter 13) adopted Bacon's atheoretical philosophy. In 1950 Skinner wrote an article titled "Are Theories of Learning Necessary?" and his answer was no. In 1956 Skinner described his approach to experimentation. The approach involved trying one thing and then another, pursuing those things that showed promise, and abandoning those that did not. In the Skinnerian approach to research, there is no theory, no hypotheses, no mathematical analysis, and (supposedly) no preconceptions. Also in the Baconian spirit, the Skinnerians believe that the main goal of science should be to improve the human condition.

Bacon is a pivotal figure because of his extreme skepticism concerning all sources of knowledge except the direct examination of nature. He urged that nature itself be the only authority in settling epistemological questions. We see in Bacon an insistence that observations be made without any philosophical, theological, or personal preconceptions. Skepticism concerning information from the past also characterized the first great philosopher of the new age, Rene Descartes, to whom we turn next.

RENE DESCARTES

Born of wealthy parents in La Haye, France, **Rene Descartes (1596–1650)** was truly a Renaissance man; at one time or another, he was a soldier, mathematician, philosopher, scientist, and psychologist. In addition, he was a man of the world who enjoyed gambling, dancing, and adventure. But he was also an intensely private person who preferred solitude and avoided emotional attachments with people. At a time when his fame had begun to grow, he moved to Holland; while he was there, he moved 24 times without leaving a forwarding address so that he would not be bothered.

Descartes's mother died when he was barely a year old while giving birth to another son, who died three days later (Rodis-Lewis, 1998). Because his father, a wealthy lawyer, practiced law some distance from the home, Descartes was reared mainly by his grandmother, a nurse, and an older brother and sister. As one might expect, Descartes was a very bright child. He was enrolled in a Jesuit school at La Fleche when he was 10 years old and graduated when he was 16. While at La Fleche, he, like other students at the time, studied the writings of Plato, Aristotle, and the early Christian philosophers. As a student, Descartes was especially fond of mathematics, and by the time he was 21, he knew essentially everything there was to be known on the subject.

After his graduation from La Fleche, Descartes roamed freely and sampled many of life's pleasures, finally taking up residence in St. Germain, a suburb of Paris. It was there that Descartes observed a group of mechanical statues, which the queen's fountaineers had constructed for her amusement. The statues contained a system of water pipes that, when activated by a person stepping on hidden floor plates, caused a series of complex movements and sounds. As we will see shortly, this idea of complex movement being caused by a substance flowing through pipes was to have a profound influence on Descartes's later philosophy.

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René Descartes

Descartes's Search for Philosophical Truth

About the time Descartes moved to St. Germain, he experienced an intellectual crisis. It occurred to him that philosophers had been seeking truth for centuries but had been unable to agree among themselves about anything; he concluded that nothing in philosophy was beyond doubt. This realization thrust Descartes into deep depression. He decided that he would be better off learning things for himself instead of from the "experts": "I resolved to seek no other knowledge than that which I might find within myself, or perhaps in the great book of nature" (1637/1956, p. 6). Like Francis Bacon before him, Descartes sought an "intellectual fortress capable of withstanding the assaults of the skeptics" (Popkin, 1979, p. 173).

Descartes's method of self-exploration was productive almost immediately. Usually, Descartes explored his many new ideas while lying in bed; during one of these meditations, he invented analytic geometry after watching a fly in his room. Descartes noted that he could precisely describe the fly's position at any given instance with just three numbers: the fly's perpendicular distances from two walls and from the ceiling. Generalizing from this observation, Descartes showed how geometry and algebra could be integrated, making it possible to represent astronomical phenomena such as planetary orbits with numbers. More generally, Descartes had discovered an exact correspondence between the realm of numbers and the realm of physics. However complicated, all natural events were now describable in mathematical terms. Like Copernicus, Kepler, and Galileo before him and like Newton after him, Descartes reached the conclusion that ultimate knowledge is always mathematical knowledge. With the invention of analytic geometry, it was now possible to precisely describe and measure essentially all known physical phenomena. In this way, Descartes further substantiated the Pythagorean conception of the universe that had been accepted by Copernicus, Kepler, and Galileo and that was about to be elaborated further by Newton.

Next, Descartes sought other areas of human knowledge that could be understood with the same certainty as analytic geometry. Stimulated by his success in mathematics, Descartes (1637/1956) summarized his four rules for attaining certainty in any area:

> The first rule was never to accept anything as true unless I recognized it to be evidently as such: that is, carefully to avoid all precipitation and prejudgment, and to include nothing in my conclusions unless it presented itself so clearly and distinctly to my mind that there was no reason or occasion to doubt it.
>
> The second was to divide each of the difficulties which I encountered into as many parts as possible, and as might be required for an easier solution.

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> The third was to think in an orderly fashion, beginning with the things which were simplest and easiest to understand, and gradually and by degrees reaching toward a more complex knowledge, even treating, as though ordered, materials which were not necessarily so.
>
> The last was always to make enumerations so complete, and reviews so general, that I would be certain that nothing was omitted. (p. 12)

Thus began Descartes's search for philosophical truth. He resigned himself to doubt everything that could be doubted and to use whatever was certain, just as one would use axioms in mathematics. That is, that which was certain could be used to deduce other certainties. After a painful search, Descartes concluded that the only thing of which he could be certain was the fact that he was doubting; but doubting was thinking, and thinking necessitated a thinker. Thus, he arrived at his celebrated conclusion "*Cogito, ergo sum*" (I think, therefore I am). Descartes established the certainty of his own thought processes, a certainty that, for him, made the introspective search for knowledge valid.

Innate Ideas

Descartes further analyzed the content of his thought and found that some ideas were experienced with such clarity and distinctiveness that they needed to be accepted as true, and yet they had no counterparts in his personal experience. Descartes thought that such ideas were innate; that is, they were natural components of the mind. For example, he observed that even though he was imperfect, he still entertained ideas that were perfect. Because something perfect could not come from something imperfect, Descartes concluded that he could not have been the author of such ideas: "The only hypothesis left was that this idea was put in my mind by a nature that was really more perfect than I was, which had all the perfections that I could imagine, and which was, in a word, God" (1637/1956, p. 22). Descartes included among the **innate ideas** those of unity, infinity, perfection, the axioms of geometry, and God.

Because God exists, is perfect, and will not deceive humans, we can trust the information provided by our senses. However, even sensory information must be clear and distinct before it can be accepted as valid. *Clear* means that the information is represented clearly in consciousness, and *distinct* means that the conscious experience cannot be doubted or divided for further analysis. Descartes gave the example of seeing a stick partially submerged in water and concluding that it is bent. Seeing the apparently bent stick provides a clear, cognitive experience, but further analysis, such as removing the stick from the water, would show that the experience was an illusion. Thus, Descartes concluded (1) that rational processes were valid and that knowledge of the physical world gained through the senses could be accepted because God would not deceive us, but (2) that even sensory information had to be analyzed rationally in order to determine its validity.

Descartes's method, then, consisted of intuition and deduction. **Intuition** is the process by which an unbiased and attentive mind arrives at a clear and distinct idea, an idea whose validity cannot be doubted. Once such an idea is discovered, one can deduce from it many other valid ideas. An example would be first arriving at the idea that God exists and then deducing that we can trust our sensory information because God would not deceive us. It is important to note that Descartes's method restored the dignity to purely subjective experience, which had been lost because of Galileo's philosophy. In fact, Descartes found that he could doubt the existence of everything physical (including his own body) but could not doubt the existence of himself as a thinking being. The first principles of Descartes's philosophy were cognitive in nature and were arrived at by intuition. There is also no mathematical concept any more certain than *Cogito, ergo sum*; this being so, we can turn our attention inward to the mind (self, soul, ego) and examine such subjective experiences as thinking, willing, perceiving, feeling, and imagining.

Although Descartes's philosophy was anchored in rational and phenomenological processes, he had

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an entirely mechanistic conception of the physical world, of all animal behavior, and of much human behavior. In his view, animals responded to the world in a way that could be explained in terms of physical principles. To understand these principles, we must recall Descartes's observation of the statues in St. Germain.

The Reflex

Descartes took the statues at St. Germain as his model in explaining all animal behavior and much human behavior (that is, Descartes explained both the behavior of the statues and the behavior of animals in terms of mechanical principles). The sense receptors of the body were like the pressure plates that started the water flowing through the tubes and activated the statues. Descartes thought of the nerves as hollow tubes containing "delicate threads" that connected the sense receptors to the brain. These threads were connected to the cavities or ventricles of the brain, which were filled with **animal spirits**.

The concept of animal spirits was popular among the early Greeks (such as Aristotle) and was perpetuated by the highly influential physician Galen (ca. 129–199). By believing that the presence of animal spirits distinguished the living from the nonliving, these philosophers and physicians embraced a form of vitalism (see Chapter 1). Descartes described animal spirits as a gentle wind or a subtle flame. The delicate threads in the nerves were ordinarily taut, but when an external event stimulated a sense organ, the threads were tightened further and opened a "pore" or "conduit" in the corresponding brain area; the pore then released animal spirits into the nerves. When the animal spirits flowed to the appropriate muscles, they caused the muscles to expand and thus caused behavior.

Descartes gave as an example a person's foot coming near a flame. The heat causes a pull on the threads connected to cavities of the brain containing animal spirits. The pull opens one or more of these cavities, allowing animal spirits to travel down small, hollow tubes (nerves) to the foot muscles, which in turn expand and withdraw the foot from the flame. This was the first description of what was later called a reflex. That is, an environmental event (heat) automatically causes a response (foot withdrawal) because of the way the organism is constructed (nerves, muscles, and animal spirits).

By saying that both animal and human interactions with the environment were reflexive, Descartes made it legitimate to study nonhuman animals to learn more about the functioning of the human body. He did a great deal of dissecting and concluded from his research that not only could interactions with the environment be explained through mechanical principles but so could digestion, respiration, nourishment and growth of the body, circulation of the blood, and even sleeping and dreaming. In 1628 the British physiologist William Harvey (1578–1657) demonstrated that the heart was a large pump that forced blood into the arteries, then into the veins, then into the lungs, and then back into the arteries. In other words, Harvey discovered that the heart caused the circulation of blood and that the heart's function could be explained using the same mechanical and hydraulic principles that apply to inorganic systems. Descartes took Harvey's discovery as further evidence that many (if not all) bodily functions are mechanical in nature.

Even in Descartes's lifetime, evidence showed that his analysis of reflexive behavior was incorrect. There was fairly conclusive evidence that nerves were not hollow, and there was good evidence that there were two distinctly different types of nerves: sensory nerves carrying information from the sense receptors to the brain and motor nerves carrying information from the brain to the muscles. It also had been commonly observed that several animals continued to move and react to certain types of stimulation even after they were decapitated, and it was common knowledge that animals could acquire new responses. Although all these observations posed problems for Descartes's analysis of reflexive behavior, he never modified his position. Before long, however, others would make the necessary corrections in Cartesian theory (*Cartesian* is the term used when referring to some aspect of

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Descartes's philosophy or methodology—such as the Cartesian coordinate system you learned in math class).

The Mind–Body Interaction

As mentioned, Descartes believed that all animal behavior and internal processes could be explained mechanically, as could much human behavior and many human internal processes. There was, however, an important difference between humans and other animals. Only humans possessed a mind that provided consciousness, free choice, and rationality. Furthermore, the mind was nonphysical and the body physical; that is, the body occupied space but the mind did not. In the process of arriving at the first principle of his philosophy—"I think, therefore I am"—Descartes believed that he had discovered the fact that the mind was nonmaterial. Descartes (1637/1956) described what he next deduced from this first principle:

> I then examined closely what I was, and saw that I could imagine that I had no body, and that there was no world nor any place that I occupied, but that I could not imagine for a moment that I did not exist. On the contrary, from the very fact that I doubted the truth of other things, it followed very evidently and very certainly that I existed. On the other hand, if I had … ceased to think while all the rest of what I had ever imagined remained true, I would have had no reason to believe that I existed; therefore I concluded that I was a substance whose whole essence or nature was only to think, and which, to exist, has no need of space nor of any material thing. Thus it follows that this ego, this soul, by which I am what I am, is entirely distinct from the body and is easier to know than the latter, and that even if the body were not, the soul would not cease to be all that it now is. (p. 21)

By saying that the nonphysical mind could influence the physical body, Descartes confronted the ancient mind–body problem head on. What had been implicit in many philosophies from the time of Pythagoras was explicit in Descartes's philosophy. He clearly stated that humans possess a body that operates according to physical principles and a mind that does not and that the two interact (influence each other). So, on the mind–body problem, Descartes was a **dualist**, and the type of dualism that he subscribed to was **interactionism** (sometimes referred to as Cartesian dualism). The question, of course, is how this interaction occurs.

Because the mind was nonphysical, it could not be located anywhere. Descartes believed that the mind permeated the entire body. That the mind is not housed in the body as a captain is housed in a ship is demonstrated by the fact that our sensory experiences embellish our cognitive experiences—with color for example—and by the fact that we consciously feel bodily states such as hunger, thirst, and pain. None of these experiences or feelings would be possible if the mind were not closely related to the body. Still, Descartes sought a place where the mind exerted its influence on the body. He sought a structure in the brain because the brain stored the animal spirits. Also, the structure had to be unitary because our conscious experience, although often resulting from stimulation coming from the two eyes or two ears, is unitary. Finally, the structure had to be uniquely human because humans alone possess a mind. Descartes chose the pineal gland because it was surrounded by animal spirits (what we now call cerebrospinal fluid), it was not duplicated like other brain structures, and (he erroneously believed) it was found only in the human brain. It was through the pineal gland that the mind willed the body to act or inhibited action. When the mind willed something to happen, it stimulated the pineal gland, which in turn stimulated appropriate brain areas, causing animal spirits to flow to various muscles and thus bringing about the willed behavior.

Because the mind is free, it can inhibit or modify the reflexive behavior that the environment would elicit mechanically. Emotions are related to the amount of animal spirits involved in a response; the more animal spirits, the stronger the emotion.

Emotions are experienced consciously as *passions* such as love, wonder, hate, desire, joy, anger, or sadness. According to Descartes, the will can and should control the passions so that virtuous conduct results. If, for example, anger is experienced and angry behavior is appropriate, the mind will allow or even facilitate such behavior. If, however, such behavior is seen as inappropriate, the mind will attempt to inhibit it. In the case of an intense passion, the will may be unable to prevent the reflexive behavior, and the person will act irrationally.

Descartes was well aware of the difficulties in explaining how a nonphysical mind could interact with a physical body. After several attempts to explain this interaction, he finally decided that it could not be explained logically. Rather, he supported his argument for separate but interacting mind–body entities with common sense. Everyone, he said, has both bodily and conscious experiences and senses the fact that the two influence each other. Thus, the supreme, rational philosopher supported one of his most basic conceptions by appealing to everyday experience (Tibbetts, 1975).

Descartes's Contributions to Psychology

Descartes attempted a completely mechanistic explanation of many bodily functions and of much behavior. His mechanistic analysis of reflexive behavior can be looked on as the beginning of both stimulus-response and behavioristic psychology. He focused attention on the brain as an important mediator of behavior, and he specified the mind–body relationship with such clarity that it could be supported or refuted by others. Reactions to his notion of innate ideas were so intense that they launched new philosophical and psychological positions (modern empiricism and modern sensationalism). By actually investigating the bodies of animals to learn more about their functioning and thus about the functioning of human bodies, he gave birth to both modern physiological and comparative psychology. By making purely subjective experience respectable again, Descartes paved the way for the scientific study of consciousness. His work on conflict did not focus on sinful-versus-moral behavior but on animal-versus-human, rational-versus-irrational behavior; he was interested in the type of conflict that Freud later studied. Finally, because of his use of introspection to find clear and distinct ideas, Descartes can be looked on as an early phenomenologist.

After Descartes, some philosophers elaborated on the mechanical side of his theory by saying that humans were *nothing but* machines and that the concept of mind was unnecessary. Others stressed the cognitive side of his philosophy, saying that consciousness was the most important aspect of humans. In any case, what followed Descartes was, in one way or another, a reaction to him; for that reason, he is often considered the father of modern philosophy in general and of modern psychology in particular.

Controversy concerning Descartes's religious beliefs clearly reflects the transitional period in which he lived. If one accepts at face value what Descartes said, he undoubtedly believed in the existence of God and accepted the authority of the church (see especially Descartes, 1642/1992). However, Descartes was caught between his loyalty to the Catholic Church and his objective search for truth. Between 1629 and 1633, Descartes worked on his book *The World*, which supported many of the conclusions that Galileo had reached in his *Dialogue Concerning the Two Chief World Systems* (1632). Although Descartes believed Galileo's arguments to be valid, he decided to suppress publication of *The World* when he learned of Galileo's fate at the hands of the Inquisition. In a letter to his friend Marin Mersenne, Descartes said that he agreed with Galileo's views but that "I would not wish, for anything in the world, to maintain them against the authority of the church" (Kenny, 1970, p. 26). *The World* was published in 1664, 14 years after Descartes's death. From all this, one might assume that Descartes was a devout believer. However,

> the opposite hypothesis, that Descartes was essentially atheistic, may be argued with greater plausibility than the first

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> assumption. According to this hypothesis, Descartes was a pure naturalist caught in a social situation where nonconformity meant persecution and even death. He had no taste for martyrdom, and consequently disguised those of his views which might get him into trouble, and embellished the remainder with a show of piety that must be understood, quite literally, as life insurance. (Lafleur, 1956, p. xviii)

Descartes's Fate

Despite efforts to appease the church, Descartes's books were placed on the Catholic index of forbidden books in the belief that they led to atheism. As a result, Descartes slowed his writing and instead communicated personally with small groups or individuals who sought his knowledge. One such individual was Queen Christina of Sweden, who in 1649 invited Descartes to be her philosopher-in-residence, and he accepted. Unfortunately, the queen insisted on being tutored at five o'clock each morning, meaning that Descartes had to travel to the palace before sunrise during the Swedish winter. After only six months in Sweden, Descartes caught pneumonia and died on February 11, 1650. Descartes was first buried in Sweden in a cemetery for distinguished foreigners, but there is more to this unfortunate story:

> Sixteen years later, his body was exhumed, as it had been decided by various friends and disciples that it would be more fitting for his bodily remains to rest in France; perhaps they did not respect as seriously as he might have wished, Descartes's belief in the possibility of a disembodied spirit and the existence of mental processes in the absence of any brain. The French ambassador to Sweden took charge and first cut off Descartes's right forefinger as a personal souvenir. It was then found that the special copper coffin provided for transporting the body was too short. So the neck was severed and skull removed to be shipped separately. The coffin returned safely to Paris and Descartes's headless body was reburied with great pomp. The skull had a more sordid fate: it was stolen by an army captain, passed from one Swedish collector to another, and took 150 years to reach Paris, where it was awkwardly shelved in the Academie des Sciences and has apparently remained there ever since. (Boakes, 1984, p. 88)

Yes, the man most associated with the mind–body problem, ironically has a bit of one himself.

SUMMARY

Renaissance humanism had four major themes: a belief in the potential of the individual, an insistence that religion be more personal and less institutionalized, an intense interest in the classics, and a negative attitude toward Aristotle's philosophy. The humanists did much to break the authority of the organized church and of Aristotle's philosophy; this had to happen before a scientific attitude could develop. Although the Renaissance was a troubled time, it was a time of great curiosity and creativity. As the power of the church deteriorated, inquiry became increasingly objective because findings no longer needed to fit church dogma. Before Copernicus, the Ptolemaic system, which claimed that the earth was the stationary center of the solar system (and the universe), essentially was universally accepted. Copernicus demonstrated that the earth was not the center of the solar system. Kepler found that the paths of the planets were not circular but elliptical. Galileo concluded that the universe was lawful and that the results of experiments could be summarized mathematically. He also concluded that a science of psychology was impossible because of the subjective nature of human thought.

Newton viewed the universe as a complex, lawful, knowable machine that had been created

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and set in motion by God. Newton's science was highly theoretical and stressed deduction. Newton's success in explaining much of the physical universe in terms of a few basic laws had a profound influence on science, philosophy, and eventually psychology. In fact, Newtonian science was so successful that people began to believe science had the potential to answer all questions. In a sense, science was becoming a new religion.

Bacon wanted science to be completely untainted by past mistakes and therefore urged that scientific investigations be inductive. Bacon also wanted science to be aimed at the solution of human problems. He described four sources of error that can creep into scientific investigation: the idols of the cave, or biases resulting from personal experience; the idols of the tribe, or biases resulting from human nature; the idols of the marketplace, or biases due to the traditional meanings of words; and the idols of the theater, or blind acceptance of authority or tradition.

Like Bacon, Descartes wanted a method of inquiry that would yield knowledge that was beyond doubt. Descartes also decided that sensory information could be trusted because God had created our sensory apparatus and would not deceive us. Taking his inspiration from mechanical statues that he had observed, Descartes concluded that all animal behavior and much human behavior was mechanical. Descartes saw the mind and body as separate but interacting; that is, the body can influence the mind, and the mind can influence the body. Descartes's version of dualism is called interactionism. Descartes also believed that the mind contained several innate ideas. Descartes brought much attention to the mind–body relationship, caused great controversy over innate ideas, introspectively studied the phenomena of the mind, stimulated animal research (and thus physiological and comparative psychology), and was the first to describe the reflex—a concept that was to become extremely important in psychology.

The philosophers and scientists of the 16th and 17th centuries reviewed in this chapter were transitional figures. These thinkers were not antireligion; they were antidogma. Most of them believed that their work was revealing God's secrets. What made them different from those who had preceded them was their methods, which were motivated by apparent errors in previously accepted dogma.

DISCUSSION QUESTIONS

1. Describe the four themes that characterized Renaissance humanism and give an example of each.
2. What arguments did Erasmus offer in support of free will, and what arguments did Luther offer in opposition to it?
3. In what way did Montaigne's Skepticism stimulate the philosophical systems developed by Bacon and Descartes?
4. Describe the Ptolemaic astronomical system and explain why that system was embraced by Christian theologians.
5. On what basis did Copernicus argue that his heliocentric theory should replace Ptolemy's geocentric theory?
6. On what philosophical conception of the universe was the work of Copernicus, Kepler, and Galileo based? Explain.
7. Summarize the theological implications of Copernicus's heliocentric theory.
8. In what way(s) can the clash between the Ptolemaic and Copernican systems be likened to a Kuhnian scientific revolution?
9. Discuss the implications for psychology of Galileo's distinction between primary and secondary qualities.
10. What is deism?
11. Summarize Bacon's view of science.
12. Describe the idols of the cave, marketplace, theater, and tribe.

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13. Distinguish between Bacon's experiments of light and experiments of fruit and describe how the two are related.
14. What was it that Descartes thought he could be certain of? Once this certainty was arrived at, how did Descartes use it in further developing his philosophy?
15. Why did Descartes reach the conclusion that some ideas are innate? Give examples of ideas that he thought were innate.
16. Summarize Descartes's view of the mind–body relationship.
17. How did Descartes reach the conclusion that the mind is nonmaterial and has an existence independent of the body?
18. What were Descartes's contributions to psychology?

SUGGESTIONS FOR FURTHER READING

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GLOSSARY

Animal spirits The substance Descartes (and others) thought was located in the cavities of the brain. When this substance moved via the nerves from the brain to the muscles, the muscles swelled and behavior was instigated.

Aristarchus of Samos (ca. 310–230 B.C.) Sometimes called the Copernicus of antiquity, speculated that the planets, including the earth, rotate around the sun and that the earth rotates on its own axis, and he did so almost 1,700 years before Copernicus.

Bacon, Francis (1561–1626) Urged an inductive, practical science that was free from the misconceptions of the past and from any theoretical influences.

Bruno, Giordano (1548–1600) Accepted the mystical non-Christian philosophy of Hermetism and Copernicus's heliocentric theory because he mistakenly believed that it supported Hermetism. He was burned at the stake for his beliefs.

Copernicus, Nicolaus (1473–1543) Argued that the earth rotated around the sun and therefore the earth was not the center of the solar system and the universe as the church had maintained.

Deduction The method of reasoning by which conclusions must follow from certain assumptions, principles, or concepts. If there are five people in a room, for example, one can deduce that there are also four; or if it

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is assumed that everything in nature exists for a purpose, then one can conclude that humans, too, exist for a purpose. Deductive reasoning proceeds from the general to the particular.

Deism The belief that God's creation of the universe exhausted his involvement with it.

Descartes, Rene (1596–1650) Believed that much human behavior can be explained in mechanical terms, that the mind and the body are separate but interacting entities, and that the mind contains innate ideas. With Descartes began comparative-physiological psychology, stimulus-response psychology, phenomenology, and a debate over whether innate ideas exist. Descartes also focused attention on the nature of the relationship between the mind and the body.

Dualist One who believes that a person consists of two separate entities: a mind, which accounts for one's mental experiences and rationality, and a body, which functions according to the same biological and mechanical principles as do the bodies of nonhuman animals.

Erasmus, Desiderius (1466–1536) A Renaissance humanist who opposed fanaticism, religious ritual, and superstition. He argued in favor of human free will.

Ficino, Marsilio (1433–1499) Founded a Platonic academy in 1462 and sought to do for Plato's philosophy what the Scholastics had done for Aristotle's.

Galileo (1564–1642) Showed several of Aristotle's "truths" to be false and, by using a telescope, extended the known number of bodies in the solar system to 11. Galileo argued that science could deal only with objective reality and that because human perceptions were subjective, they were outside the realm of science.

Geocentric theory The theory, proposed by Ptolemy, that the sun and planets rotate around the earth.

Heliocentric theory The theory, proposed by Copernicus, that the planets, including the earth, rotate around the sun.

Humanism A viewpoint that existed during the Renaissance. It emphasized four themes: individualism, a personal relationship with God, interest in classical wisdom, and a negative attitude toward Aristotle's philosophy.

Idols of the cave Bacon's term for personal biases that result from one's personal characteristics or experiences.

Idols of the marketplace Bacon's term for error that results when one accepts the traditional meanings of the words used to describe things.

Idols of the theater Bacon's term for the inhibition of objective inquiry that results when one accepts dogma, tradition, or authority.

Idols of the tribe Bacon's term for biases that result from human's natural tendency to view the world selectively.

Induction The method of reasoning that moves from the particular to the general. After a large number of individual instances are observed, a theme or principle common to all of them might be inferred. Deductive reasoning starts with some assumption, whereas inductive reasoning does not. Inductive reasoning proceeds from the particular to the general.

Innate ideas Ideas, like perfection and the axioms of geometry, that Descartes believed could not be derived from one's own experience. Such ideas, according to Descartes, were placed in the mind by God.

Interactionism The version of dualism that accepts the separate existence of a mind and a body and claims that they interact.

Intuition In Descartes's philosophy, the introspective process by which clear and distinct ideas are discovered.

Kepler, Johannes (1571–1630) By observation and mathematical deduction, determined the elliptical paths of the planets around the sun. Kepler also did pioneer work in optics.

Luther, Martin (1483–1546) Was especially disturbed by corruption within the church and by the church's emphasis on ritual. He believed that a major reason for the church's downfall was its embracing of Aristotle's philosophy, and he urged a return to the personal religion that Augustine had described. He accepted Augustine's concept of predestination but denied human free will. His attack of the established church contributed to the Reformation, which divided Europe into warring camps.

Montaigne, Michel de (1533–1592) Like the earlier Greek and Roman Skeptics, believed there was no objective way of distinguishing among various claims of truth. His doubts concerning human knowledge stimulated a number of subsequent thinkers such as Bacon and Descartes.

Newton, Isaac (1642–1727) Extended the work of Galileo by showing that the motion of all objects in the universe could be explained by his law of gravitation. Although Newton believed in God, he believed that God's will could not be evoked as an explanation of any physical phenomenon. Newton viewed the universe as a complex machine that God had created, set in motion, and then abandoned.

Petrarch, Francesco (1304–1374) A Renaissance humanist referred to by many historians as the father of the Renaissance. He attacked Scholasticism as stifling the human spirit and urged that the classics be studied not for their religious implications but because they were the works of unique human beings. He insisted that God had given humans their vast potential so that it could be utilized. Petrarch's views about human potential helped stimulate the many artistic and literary achievements that characterized the Renaissance.

Pico, Giovanni (1463–1494) Maintained that humans, unlike angels and animals, are capable of changing themselves and the world. He believed that all philosophical positions should be respected and the common elements among them sought.

Positivism The belief that only those objects or events that can be experienced directly should be the object of scientific inquiry. The positivist actively avoids metaphysical speculation.

Primary qualities Attributes of physical objects: for example, size, shape, number, position, and movement or rest.

Protestantism The religious movement that denied the authority of the pope and of Aristotle. It argued against church hierarchy and ritual and instead wanted a simple, deeply personal, and introspective religion like that described by St. Paul and St. Augustine.

Ptolemaic system A conception of the solar system that has the earth as its center. During the Middle Ages, the Ptolemaic system was widely accepted because it (1) agreed with everyday experience; (2) was able to predict and account for all astronomical phenomena known at the time; (3) gave humans a central place in the universe; and thus agreed with the biblical account of creation.

Ptolemy (fl. second century A.D.) The Greco-Egyptian astronomer whose synthesis of earlier and contemporary astronomical works came to be called the Ptolemaic system. (*See also* **Ptolemaic system**.)

Reformation The attempt of Luther and others to reform the Christian church by making it more Augustinian in character. This effort resulted in the division of western European Christianity into Protestantism and Roman Catholicism.

Renaissance The period from about 1450 to about 1600 when there was a rebirth of the open, objective inquiry that had characterized the early Greek philosophers.

Secondary qualities Those apparent attributes of physical objects that in fact exist only in the mind of the perceiver—for example, the experiences of color, sound, odor, temperature, and taste. Without a perceiver, these phenomena would not exist.

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5

Empiricism, Sensationalism, and Positivism

Descartes was so influential that most of the philosophies that developed after him were reactions to some aspect of his work. The British and French philosophers denied Descartes's contention that some ideas are innate, saying instead that all ideas are derived from experience. These philosophers attempted to explain the functioning of the mind as Newton had explained the functioning of the universe. That is, they sought a few principles, or laws, that could account for all human mental experience.

German philosophers made an active mind central to their conception of human nature. Instead of envisioning a mind that simply recorded and stored sensory experiences, they saw the mind as actively transforming sensory information, thereby giving that information meaning it otherwise would not have. For these German rationalists, knowing the operations of this active mind was vital in determining how humans confront and understand their world.

Scattered throughout Europe, the romantic philosophers rebelled against the views of the empiricists and rationalists. According to the romantics, both of these philosophies concentrated on one aspect of humans and neglected others. The romantics urged a focus on the total person, a focus that included two aspects the other philosophies minimized: human emotions and the uniqueness of each individual.

After Descartes, and to a large extent because of him, the philosophies of empiricism, rationalism, and romanticism took center stage. In this chapter, we focus on British empiricism and French sensationalism. We will review German rationalism in Chapter 6 and romanticism in Chapter 7.

BRITISH EMPIRICISM

An empiricist is anyone who believes that knowledge is derived from experience. **Empiricism**, then, is a philosophy that stresses the importance of experience in the attainment of knowledge. The term *experience*, in the definition of empiricism, complicates matters because there are many types of experience. There are "inner" experiences such as dreams, imaginings, fantasies, and a variety of emotions. Also, when one thinks logically, such as during mathematical deduction, one is having mental experiences. There is general agreement, however, to exclude such inner experiences from a definition of empiricism and refer exclusively to sensory experience. Yet, even after focusing on sensory experience, there is still a problem because the implication is that any philosopher who claims sensory experience to be vital in attaining knowledge is an empiricist. If this were true, Descartes could be called an empiricist because, for him, many ideas came from sensory experience. Thus, acknowledging the importance of sensory experience *alone* does not qualify one as an empiricist.

What then is an empiricist? In this text, we will use the following definition of empiricism:

> Empiricism … is the epistemology that asserts that *the evidence of sense constitutes the primary data of all knowledge; that knowledge cannot exist unless this evidence has first been gathered; and that all subsequent intellectual processes must use this evidence and only this evidence in framing valid propositions about the real world*. (D. N. Robinson, 1986, p. 205)

It is important to highlight a number of terms in Robinson's definition. First, this definition asserts that sensory experience constitutes the *primary* data of all knowledge; it does not say that such experience alone constitutes knowledge. Second, it asserts that knowledge cannot exist until sensory evidence has *first* been gathered; so for the empiricist, attaining knowledge *begins with* sensory experience. Third, *all subsequent intellectual processes* must focus only on sensory experience in formulating propositions about the world. Thus, it is not the recognition of mental processes that distinguishes the empiricist from the rationalist; rather, it is what those thought processes are focused on. Again, most epistemological approaches use sensory experience as part of their explanation of the origins of knowledge; for the empiricist, however, sensory experience is of supreme importance.

Thomas Hobbes

Although he followed in the tradition of William of Occam and Francis Bacon, **Thomas Hobbes (1588–1679)** is sometimes also referred to as the founder of British empiricism. Hobbes was educated at Oxford and was friends with both Galileo and Descartes. He also served as Bacon's secretary for a short time. Hobbes was born in Malmesbury, Wiltshire, England. He often joked that he and fear were born twins because his mother attributed his premature birth to her learning of the approaching Spanish Armada. Hobbes's father, an Anglican vicar, got into a fight in the doorway of his church and thereafter disappeared. The care of his children was left to a prosperous brother who eventually provided Hobbes with an Oxford education, but Hobbes claimed that he learned little of value from that venture. Hobbes noted that Oxford had a strong Puritan tradition but also had an abundance of "drunkenness, wantonness, gaming, and other such vices" (Peters, 1962, p. 7). Hobbes lived a long, productive, and influential life. He played tennis until the age of 70, and at 84 he wrote his autobiography. At 86 he published a translation of *The Iliad* and *The Odyssey* just for something to do. Prior to his death, he amused himself by having his friends prepare epitaphs for him. Hobbes achieved great fame in his lifetime: "Indeed, like Bernard Shaw, by the time of his death he had become almost an English institution" (Peters, 1962, p. 16).

Humans as Machines. Hobbes did not become serious about philosophy until the age of 40, when he came across a copy of Euclid's *Elements*. This book convinced him that humans could be understood using the techniques of geometry.

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Thomas Hobbes

That is, starting with a few undeniable premises, a number of undeniable conclusions could be drawn. The question was what premises to begin with, and the answer came from Galileo. After visiting Galileo in 1635, Hobbes became convinced that the universe consisted only of matter and motion and that both could be understood in terms of mechanistic principles. Why, asked Hobbes, could not humans too be viewed as machines consisting of nothing but matter and motion? Galileo was able to explain the motion of physical objects in terms of the external forces acting on them—that is, without appealing to inner states or essences. Are not humans part of nature, wondered Hobbes, and if so, cannot their behavior also be explained as matter in motion? This became the self-evident truth that Hobbes needed to apply the deductive method of geometry: *Humans were machines*. Humans were viewed as machines functioning within a larger machine (the universe): "For seeing life is but motion of limbs.… For what is the *heart* but a *spring*; and the *nerves* but so many *strings*; and the *joints* but so many *wheels*, giving motion to the whole body" (Hobbes, 1651/1962, p. 19).

It is interesting to note that although Hobbes was a close friend of Bacon and had himself a considerable reputation, Hobbes was never asked to join the prestigious British Royal Society (founded in 1660). The reason was that the society was dominated by Baconians, and Hobbes had nothing but contempt for Bacon's inductive method. He accused the Baconians of spending too much time on gadgets and experiments and of preferring their eyes, ears, and fingertips to their brains. Instead, Hobbes chose the deductive method of Galileo and Descartes. With Hobbes, we have the first serious attempt to apply the ideas and techniques of Galileo to the study of humans.

Government and Human Instincts. Like many of the philosophers we will see in this chapter, Hobbes's primary interest was politics. He was thoroughly convinced that the best form of government was an absolute monarchy. He believed that humans were naturally aggressive, selfish, and greedy; therefore, democracy was dangerous because it gives too much latitude to these negative natural tendencies. Only when people (and the church) are subservient to a monarch, he felt, could there be law and order. Without such regulation, human life would be "solitary, poor, nasty, brutish, and short" (Hobbes, 1651/1962, p. 100). Hobbes's infamous conclusion, *Homo homini lupus* (Man is a wolf to man), was later quoted sympathetically by Schopenhauer (see Chapter 7) and Freud (see Chapter 16).

It is, according to Hobbes, fear of death that motivates humans to create social order. In other words, civilization is created as a matter of self-defense; each of us must be discouraged from committing crimes against the other. Unless interfered with, humans would selfishly seek power over others so as to guarantee the satisfaction of their own personal needs: "I put for a general inclination of all mankind, a perpetual and restless desire of power after power, that ceaseth only in death" (1651/1962, p. 80). The monarch was seen by Hobbes as the final arbitrator in all matters of law, morals, and religion, and the freedom of a person consisted only in those activities not forbidden by law. The laws are determined and enforced by the monarch. Hobbes offended all types of Christians by saying that the church should be subservient to the state and that all human actions could be explained mechanically (and therefore free will

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was an illusion). Hobbes's most famous work, *Leviathan* (1651), was mainly a political treatise, an attempt to explain and justify rule by an absolute monarch. Hobbes began *Leviathan* with his views on psychology because it was his belief that to govern effectively, a monarch needed to have an understanding of human nature.

Leviathan became viewed as the work of an atheist, and in 1666 a motion was made in parliament to burn Hobbes as a heretic. The plague of 1665 and the great fire of London the following year were believed by many to be God's revenge on England for harboring Hobbes. King Charles II came to his rescue, however, and, as mentioned before, Hobbes went on to live a long, productive life. He died at the age of 91.

Hobbes's Empiricism. Although Hobbes rejected Bacon's inductive method in favor of the deductive method, he did agree with Bacon on the importance of sensory experience:

> The [origin of all thoughts] is that which we can *sense*, for there is no conception in a man's mind, which hath not at first, totally, or by parts, been begotten upon the organs of sense. The rest are derived from that original. (Hobbes, 1651/1962, p. 21)

Although Hobbes accepted Descartes's deductive method, he rejected his concept of innate ideas. For Hobbes, all ideas came from experience or, more specifically, from *sensory experience*.

Following in the tradition of Democritus, Hobbes was also a materialist. Because all that exists is matter and motion, Hobbes thought it absurd to postulate a nonmaterial mind, as Descartes had done. All so-called mental phenomena could be explained by the sense experiences that result when the motion of external bodies stimulates the sense receptors, thereby causing internal motion. What others refer to as "mind," for Hobbes, was nothing more than the sum total of a person's thinking activities—that is, a series of motions within the individual. Concerning the mind-body problem, Hobbes was a physical monist; he denied the existence of a nonmaterial mind.

Explanation of Psychological Phenomena. *Attention* was explained by the fact that as long as sense organs retain the motion caused by certain external objects, they cannot respond to others. The availability of mental imagery, for Hobbes *imagination*, was explained by the fact that sense impressions decay over time, as did *memory*; "So … imagination and memory are but one thing which for divers considerations hath divers names" (1651/1962, p. 24). *Dreams* then have this same origin: "The imaginations of them that sleep are those we call *dreams*. And these also, as all other imaginations, have been before, either totally or by parcels, in the sense" (Hobbes, 1651/1962, p. 25). The reason that dreams are typically so vivid is because during sleep there are no new sensory impressions to compete with the imagination.

Hobbes argued that external objects not only produce sense impressions but also influence the vital functions of the body. Those incoming impressions that facilitate vital functions are experienced as pleasurable, and the person seeks to preserve them or to seek them out. Conversely, sense impressions incompatible with the vital functions are experienced as painful, and the person seeks to terminate or avoid them. Human behavior, then, is motivated by *appetite* (the seeking or maintaining of pleasurable experiences) and *aversion* (the avoidance or termination of painful experiences). In other words, Hobbes accepted a hedonistic theory of motivation. According to Hobbes, we use terms such as *love* and *good* to describe things that please us and terms such as *hate* and *evil* to describe things to which we have an aversion. By equating good with pleasure and evil (bad) with pain, Hobbes was taking a clear stand on moral issues: "Having insinuated this identity, Hobbes had both stated and explained moral relativism: there were no objective moral properties, but what seemed good was what pleased any individual or was good for *him*" (Tuck, 2002, p. 65).

In Hobbes's deterministic view of human behavior, there was no place for *free will*. People may *believe* they are "choosing" because at any given moment one may be confronted with a number of appetites and aversions and therefore there may be conflicting tendencies to act. For Hobbes, *will* was defined as the action tendency that prevails when a number of such tendencies exist simultaneously. What appears to be choice is nothing more than a verbal label we use to describe the attractions and aversions we experience while interacting with the environment. Once a prevalent behavioral tendency emerges, "freedom" is simply "the condition of having no hindrance to the securing of what one wants" (Tuck, 2002, p. 57).

Complex Thought Processes. Hobbes also attempted to explain "trains of thought," by which he meant the tendency of one thought to follow another in some coherent manner. The question was how such a phenomenon occurs, and Hobbes's answer, reintroduced the law of contiguity first proposed by Aristotle. That is, events that are experienced together are remembered together and are subsequently thought of together. All the British empiricists who followed Hobbes accepted this concept of association as their explanation as to why mental events are experienced or remembered in a particular order.

To summarize Hobbes's position, we can say that he was a *materialist* because he believed that all that existed was physical; he was a *mechanist* because he believed that the universe and everything in it (including humans) were machines; he was a *determinist* because he believed that all activity (including human behavior) is caused by forces acting on physical objects; he was an *empiricist* because he believed that all knowledge was derived from sensory experience; and he was a *hedonist* because he believed that human behavior (as well as the behavior of nonhuman animals) was motivated by the seeking of pleasure and the avoidance of pain. Although, as we will see, not all the empiricists that followed Hobbes were as materialistic or mechanistic as he was, they all joined him in denying the existence of innate ideas.

John Locke

John Locke (1632–1704) was born at Wrington in Somerset, England, six years after the death of Francis Bacon. His father was a Puritan, a small landowner, and an attorney. Locke was a 17-year-old student at Westminster School when, on January 30, 1649, King Charles I was executed as a traitor to his country. The execution, which Locke may have witnessed, took place in the courtyard of Whitehall Palace, which was close to Locke's school. Locke was born 10 years before the outbreak of civil war, and he lived through this great rebellion that was so important to English history. It was at least partially due to the Zeitgeist, then, that Locke, as well as several of his fellow students, was to develop a lifelong interest in politics. Indeed, Locke was to become the most influential political philosophers in post-Renaissance Europe.

In 1652 Locke, at age 20, obtained a scholarship from Oxford University, where he earned his bachelor's degree in 1656 and his master's degree in 1658. His first publication was a poem that he wrote, when he was an undergraduate, as a tribute to Oliver Cromwell. Locke remained at Oxford for 30 years, having academic appointments in Greek, rhetoric, and moral philosophy. He also studied medicine, and on his third attempt, he finally attained his doctorate in medicine in 1674. It was through his medical studies that Locke met Robert Boyle (1627–1691), who influenced him greatly. Boyle was one of the founders of the Royal Society and of

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John Locke

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modern chemistry. Locke became Boyle's friend, student, and research assistant. From Boyle, Locke learned that physical objects were composed of "minute corpuscles" that have just a few intrinsic qualities. These corpuscles can be experienced in many numbers and arrangements. Some arrangements result in the experience of primary qualities and some in the experience of secondary qualities. We will see shortly that Boyle's "corpuscular hypothesis" strongly influenced Locke's philosophy. Locke became a member of the Royal Society, and as a member performed some studies and demonstrations in chemistry and meteorology. Newton was only 10 years old when Locke arrived at Oxford, but in 1689 the two men met and Locke referred to him as the "incomparable Mr. Newton." Locke corresponded with Newton for the rest of his life, primarily on theological matters.

Among Locke's lesser known works were his editing of Boyle's *General History of the Air*, an edition of Aesop's *Fables* designed to help children learn Latin, and a book on money and interest rates (Gregory, 1987). His most famous work, however, and the one most important to psychology was *An Essay Concerning Human Understanding* (1690). Locke worked on the *Essay* for 17 years, and it was finally published when Locke was almost 60 years old. After its original publication, Locke revised the *Essay* several times, and it eventually went into five editions. The fifth edition appeared posthumously in 1706, and it is on this final edition that most of what follows is based. After publishing the *Essay*, Locke wrote prolifically on such topics as education, government, economics, and Christianity. Voltaire (1694–1778) greatly admired Locke and did much to create a positive impression of Locke on the continent, especially in France.

Although Hobbes was clearly an empiricist, it was Locke who shaped most of subsequent British empiricism. For example, most of the British empiricists followed Locke in accepting a mind-body dualism; that is, they rejected Hobbes's physical monism (materialism). Whereas Hobbes equated mental images with the motions in the brain that were caused by external motions acting on the sense receptors, Locke was content to say that *somehow* sensory stimulation caused ideas. Early in the *Essay*, Locke washed his hands of the question as to how something physical could cause something mental—it just did.

Opposition to Innate Ideas. Locke's *Essay* was, in part, a protest against Descartes's philosophy. It was not Descartes's dualism that Locke attacked but his notion of innate ideas. Despite Hobbes's efforts, the notion of innate ideas was still very popular in Locke's time. Especially influential was the belief that God had instilled in humans innate ideas of morality. Locke observed that if the mind contained such innate ideas, then all humans should have those same ideas, and clearly they do not. Humans, he said, are not born with any innate ideas, whether they be moral, theological, logical, or mathematical.

Where, then, do all the ideas that humans have come from? Locke's (1706/1974) famous answer was as follows:

> Let us then suppose the mind to be, as we say, white paper, void of all characters, without any ideas; how comes it to be furnished? Whence comes it by that vast store which the busy and boundless fancy of man has painted on it with an almost endless variety? Whence has it all the materials of reason and knowledge? To this I answer, in one word, from *experience*. In that all our knowledge is founded, and from that it ultimately derives itself. Our observation employed either about external sensible objects, or about the internal operations of our minds perceived and reflected on by ourselves, is that which supplies our understandings with all the materials of thinking. These two are the fountains of knowledge, from whence all the ideas we have, or can naturally have, do spring. (pp. 89–90)

Sensation and Reflection. For Locke, an **idea** was simply a mental image that could be employed while thinking: "Whatsoever the mind perceives in itself, or is the immediate object of perception, thought, or understanding, that I call idea" (1706/1974, pp. 111–112). For Locke, all ideas come from either **sensation** or **reflection**. That is, ideas result either by direct sensory stimulation or by reflection on the remnants of prior sensory stimulation.

Thus, the source of all ideas is sensation, but the ideas obtained by sensation can be acted on and rearranged by the operations of the mind, thereby giving rise to new ideas. The operations the mind can bring to bear on the ideas furnished by sensation include "perception, thinking, doubting, believing, reasoning, knowing, and willing" (Locke, 1706/1974, p. 90). Locke is often said to have postulated a passive mind that simply received and stored ideas caused by sensory stimulation. This was true, however, only of sensations. Once the ideas furnished by sensation are in the mind, they can be actively transformed into an almost endless variety of other ideas by the mental operations involved in reflection.

It is important to note, however, Locke's insistence that *all* knowledge is ultimately derived from sensory experience. Although the *contents* of the mind are derived from sensory stimulation, the operations of the mind are part of human nature; they are innate. As an empiricist, Locke opposed the notion of specific innate ideas but not innate operations (faculties) of the mind.

Ideas and Emotions. **Simple ideas**, whether from sensation or reflection, constitute the atoms (corpuscles) of experience because they cannot be divided or analyzed further into other ideas. **Complex ideas**, however, are composites of simple ideas and therefore can be analyzed into their component parts (simple ideas). When the operations of the mind are applied to simple ideas through reflection, complex ideas are formed. That is, through such operations as comparing, remembering, discriminating, combining and enlarging, abstracting, and reasoning, simple ideas are combined into complex ones. As Locke (1706/1974) explained,

> Simple ideas, the materials of all our knowledge, are suggested and furnished to the mind only by … sensation and reflection. When the understanding is once stored with these simple ideas, it has the power to repeat, compare, and unite them, even to an almost infinite variety, and so can make at pleasure new complex ideas. But it is not in the power of the most exalted wit or enlarged understanding, by any quickness or variety of thought, to *invent* or *frame* one new simple idea in the mind, not taken in by the ways before mentioned: nor can any force of the understanding *destroy* those that are there. I would have anyone try to fancy any taste which had never affected his palate, or frame the idea of a scent he had never smelt: and when he can do this, I will also conclude that a blind man hath ideas of colours, and a deaf man true distinct notions of sounds. (pp. 99–100)

The mind, then, can neither create nor destroy ideas, but it can arrange existing ideas in an almost infinite number of configurations.

Locke also maintained that the feelings of pleasure or pain accompany both simple and complex ideas. He believed that the other passions (emotions)—like love, desire, joy, hatred, sorrow, anger, fear, despair, envy, shame, and hope—were all derived from the two basic feelings of pleasure and pain. Things that cause pleasure are good, and things that cause pain are evil (note the similarity to Hobbes). For Locke, the "greatest good" was the freedom to think pleasurable thoughts. Like Hobbes, his theory of human motivation was hedonistic because it maintained that humans are motivated by the search for pleasure and the avoidance of pain. For Locke then, the information that the senses provided was the stuff the mind thought about and had emotional reactions toward.

Primary and Secondary Qualities. The distinction between primary and secondary qualities is the distinction that several early Greeks, and later Galileo, made between what is physically present and what is experienced psychologically. However,

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it was Locke's friend and teacher Robert Boyle who introduced the terms *primary qualities* and *secondary qualities*, and Locke borrowed the terms from him (Locke, 1706/1974).

Unfortunately, primary and secondary qualities have been defined in two distinctively different ways through the centuries. One way has been to define primary qualities as attributes of physical reality and secondary qualities as attributes of subjective or psychological reality. That is, primary qualities refer to actual attributes of physical objects or events, but secondary qualities refer to psychological experiences that have no counterparts in the physical world. We covered this approach in our discussion of Galileo in Chapter 4, but Boyle and Locke took a different path. For them, both primary and secondary qualities referred to characteristics of the physical world; what distinguished them was the type of psychological experience they caused.

Following Boyle, Locke referred to any aspect of a physical object that had the power to produce an idea as a **quality**. Primary qualities have the power to create in us ideas that correspond to actual physical attributes of physical objects—for example, the ideas of solidity, extension, shape, motion or rest, and quantity. With primary qualities, there is a match between what is physically present and what is experienced psychologically. The secondary qualities of objects also have the power to produce ideas, but the ideas they produce do not correspond to anything in the physical world. The ideas produced by secondary qualities include those of color, sound, temperature, and taste.

Locke's **paradox of the basins** dramatically demonstrated the nature of ideas caused by secondary qualities. Suppose we ask, Is temperature a characteristic of the physical world? In other words, Is it not safe to assume that objects in the physical world are hot or cold or somewhere in between? Looked at in this way, temperature would be a primary quality. Locke beckoned his readers to take three water basins: one containing cold water (basin A), one containing hot water (basin B), and the other containing warm water (basin C). If a person places one hand in basin A and the other in basin B, one hand will feel hot and the other cold, supporting the contention that hot and cold are properties of the water (that is, that temperature is a primary quality). Next, Locke instructed the reader to place both hands in basin C, which contains the warm water. To the hand that was previously in basin A (cold water), the water in basin C will feel hot; to the hand that was previously in basin B (hot water), the water will feel cold, even though the temperature of the water in basin C is physically the same for both hands. Thus, Locke demonstrated that the experience of hot and cold depended on the experiencing person, and temperature therefore reflected secondary qualities.

For Locke, the important point was that some of our psychological experiences reflected the physical world as it actually was (those experiences caused by primary qualities) and some did not (those experiences caused by secondary qualities). He did not say, as Galileo had, that subjective reality was inferior to physical reality. For Locke, subjective reality could be studied as objectively as physical reality, and he set out to do just that.

Association of Ideas. **Associationism** is "a psychological theory which takes association to be the fundamental principle of mental life, in terms of which even the higher thought processes are to be explained" (Drever, 1968, p. 11). According to this definition, it is possible to reject associationism and still accept the fact that associative learning does occur. Such was the case with Locke. In fact, Locke's discussion of association came as an afterthought, and a short chapter titled "Association of Ideas" did not appear until the fourth edition of *Essay*. Even then, association was used primarily to explain *errors* in reasoning.

As we have seen, Locke believed that most knowledge is attained by actively reflecting on the ideas in the mind. By comparing, combining, relating, and otherwise thinking about ideas, we attain our understanding of the world, morality, and ourselves. Where, then, does association enter into Locke's deliberations? Locke used association to explain the *faulty beliefs* that can result from accidents of time or circumstance. Locke called the beliefs that resulted from associative learning "a degree of madness" (1706/1974, p. 250) because they were in opposition to reason. In addition to ideas that are clustered in the mind because of some logical connection among them, some ideas are naturally associated, such as when the odor of bread baking causes one to have the idea of bread. These are safe and sure types of associations because they are determined by natural relationships. The types of associations that constitute a degree of madness are learned by chance, custom, or mistake. These associations lead to errors in understanding, whereas natural associations do not.

Locke believed that ideas that succeeded each other because of natural or rational reasons represented true knowledge but that ideas that became associated fortuitously, because of their contiguity, could result in unreasonable beliefs. As examples of unreasonable beliefs, Locke included the following: A person who eats too much honey becomes sick and thereafter avoids even the thought of honey (today we call the subsequent avoidance of substances that cause illness the Garcia Effect—in honor of Hispanic American psychologist John Garcia, who received APA's award for Distinguished Scientific Contribution in 1979 for his research on such phenomenon); a child whose maid associates darkness with evil spirits and goblins will grow up with a fear of darkness; a person undergoing painful surgery will develop an aversion to the surgeon; and children who are taught reading by harsh corrective methods will develop a lifelong aversion to reading.

Following Drever's (1968) definition of associationism as an attempt to reduce all mental activity to associative principles, Locke's philosophy certainly did not exemplify associationism. Although his short chapter on the association of ideas did mention the learning of natural associations, he focuses on the learning of those that are "unnatural." As we shall see, for the British empiricists and French sensationalists who followed Locke, the laws of association took on a greater significance. In their efforts to become "Newtons of the mind," they argued that ideas corresponded to Boyle's corpuscles and that the laws of association provided the gravity that held ideas together.

Education. Locke's book *Some Thoughts Concerning Education* (1693/2000) had a profound and long-lasting influence on education throughout the Western world. By insisting that nurture (experience) was much more important than nature (innate ability) for character development, his views on education were in accordance with his empirical philosophy.

For Locke, important education took place both at home and at school. He encouraged parents to increase stress tolerance in their children (a process he called hardening) by having them sleep on hard rather than soft beds. Exposing children to moderate amounts of coldness and wetness would also increase tolerance for the inevitable hardships of life. Crying should be discouraged with physical punishment, if necessary. Parents should provide their children with sufficient sleep, food, fresh air, and exercise because good health and effective learning are inseparable.

Concerning classroom practices, mild physical punishment of students was advocated but severe physical punishment was not. Teachers, Locke believed, should always make the learning experience as pleasant as possible so that learning beyond school will be sought. If learning occurs under aversive conditions, it will be avoided both in school and beyond. A step-by-step approach to teaching complex topics was recommended to avoid overwhelming and thus frustrating students. For the same reason, excessive and overly rigorous assignments should be avoided. The primary job of the teacher should be to recognize and praise student accomplishments.

How does one deal with a child's irrational fears? Locke used a child with a fear of frogs to exemplify his technique:

> Your child shrieks, and runs away at the sight of a Frog; Let another catch it, and lay it down at a good distance from him: At first accustom him to look upon it; When he can do that, then come nearer to it, and see it leap without Emotion; then to touch it lightly when it is held fast in another's hand; and so on, till he can come to handle it as confidently as a Butterfly, or a Sparrow. By the same way any other vain Terrors

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> may be remov'd; if Care be taken, that you go not too fast, and push not the Child on to a new degree of assurance, till he be thoroughly confirm'd in the former.
> (Locke, 1693/2000, pp. 177–178)

The advice given by Locke for dealing with irrational fears was remarkably similar to the kind of behavioral therapy employed many years later by Mary Cover Jones (see Chapter 12).

With the exception of teaching stress tolerance, Locke's ideas concerning education now appear rather routine. They were, however, anything but routine when he first proposed them.

Government by the People and for the People. Although for us he is a patriarch of British empiricism, Locke likely saw himself as a political philosopher. Locke attacked not only the notion of innate ideas but also the notion of innate moral principles. He believed that much dogma was built on the assumption of one innate moral truth or another and that people should seek the truth for themselves rather than having it imposed on them. For this and other reasons, empiricism was considered to be a radical movement that sought to replace religion based on revelation with natural law. Influential politically, Locke challenged the divine right of kings and proposed a government by and for the people. His political writings on liberty and the social contract were read enthusiastically, and his ideas were influential in the drafting of the U.S. Declaration of Independence.

George Berkeley

George Berkeley (1685–1753) was born in Kilkenny, Ireland. He first attended Kilkenny College; then in 1700 at the age of 15, he entered Trinity College (University of Dublin), where he earned his bachelor's degree in 1704 at the age of 19 and his master's degree in 1707 at the age of 22. He received ordination as a deacon of the Anglican church at the age of 24, and that same year published *An Essay Towards a New Theory of Vision* (1709). A year later he published what was perhaps his most important work, *A Treatise Concerning the Principles of Human Knowledge* (1710). His third major work, *Three Dialogues Between Hylas and Philonous*, was published during his first trip to England in 1713. Berkeley's fame was firmly established by these three books before he was 30 years old. He continued on at Trinity College and lectured in divinity and Greek philosophy until 1724, when he became involved in the founding of a new college in Bermuda intended for both native and white colonial Americans. In 1728 he sailed to Newport, Rhode Island, where he waited for funding for his project. The hoped-for government grants were not forthcoming, however, and Berkeley returned to London. Berkeley's home in Whitehall (near Newport) still stands as a museum containing artifacts of his visit to colonial America. For the last 18 years of his life, Berkeley was an Anglican bishop of Cloyne in County Cork, Ireland. He died suddenly on January 14, 1753, at Oxford, where he had been helping his son enroll as an undergraduate. Just over a hundred years later, the site of the first University of California campus was named for Bishop Berkeley.

Berkeley observed that the downfall of Scholasticism, caused by attacks on Aristotle's philosophy, had resulted in widespread religious skepticism, if not actual atheism. He also noted that the new philosophy of materialism was further deteriorating the foundations of religious belief. The worldview created by materialistic philosophy, Berkeley felt, was that all matter is atomic or corpuscular in nature and that all physical events could be explained in terms of mechanical laws. The world becomes nothing but matter in motion, and the motion of moving objects is explained by natural laws, which are expressible in mathematical terms. Berkeley correctly perceived that materialistic philosophy was pushing God farther and farther out of the picture, and thus it was dangerous, if not potentially fatal, to both religion and morality. Berkeley therefore decided to attack materialism at its very foundation—its assumption that *matter* exists.

"To be is to be perceived." Berkeley's solution to the problem was bold and sweeping; he attempted to demonstrate that matter does not exist and that all claims made by materialistic philosophy must

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George Berkeley

therefore be false. In Berkeley's denial of matter, he both agreed and disagreed with Locke. He agreed with Locke that human knowledge is based *only* on ideas. However, Berkeley strongly disagreed with Locke's contention that all ideas are derived from interactions with the empirical world. Even if there were such a world, Berkeley said, we could never know it directly. All things come into existence when they are perceived, and therefore reality consists of our perceptions and nothing more.

In his discussion of primary and secondary qualities, Berkeley referred to the former as the supposed attributes of physical things and to the latter as ideas or perceptions. Having made this distinction, he then rejected the existence of primary qualities. For him, only secondary qualities (perceptions) exist. This, of course, follows from his contention that "to be is to be perceived." Berkeley argued that materialism could be rejected because there was no physical world.

Of course, Berkeley's contention that everything that exists is a perception raises several questions. For example, if reality is only a matter of perception, does reality cease to exist when one is not perceiving it? And, on what basis can it be assumed that the reality one person perceives is the same reality that others perceive? First, we must realize that Berkeley did not deny the existence of external reality. What he did deny was that external reality consisted of inert matter, as the materialists maintained:

> I do not argue against the existence of any one thing that we can apprehend, either by sense or reflection. That the things I see with my eyes and touch with my hands do exist, really exist, I make not the least question. The only thing whose existence we deny is that which *philosophers* call Matter or corporeal substance. (Armstrong, 1965, p. 74)

What creates external reality is God's perception. It is the fact that external reality is God's perception that makes it stable over time and the same for everyone. The so-called laws of nature are ideas in God's mind. On rare occasions, God may change his mind and thus vary the "laws of nature," creating "miracles," but most of the time his perceptions remain the same.

What we experience through our senses, then, are the ideas in God's mind; with experience, the ideas in our minds come to resemble those in God's mind, in which case it is said that we are accurately perceiving external reality. "To be is to be perceived," and God perceives the physical world, thus giving it existence; we perceive God's perceptions, thus giving those perceptions life in our minds as ideas. If secondary qualities are understood as ideas whose existence depends on a perceiver, then all reality consists of secondary qualities.

Principle of Association. According to Berkeley, each sense modality furnishes a different and separate type of information (idea) about an object. It is only through experience that we learn that certain ideas are always associated with a specific object:

> By sight I have the ideas of light and colours, with their several degrees and variations. By touch I perceive hard and soft, heat and cold, motion and resistance; and of all these more and less either as to quantity or degree. Smelling furnishes me with odours; the palate with tastes; and hearing conveys sounds to the mind in all their variety of tone and composition.

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> And as several of these are observed to accompany each other, they come to be marked by one name, and so to be reputed as one *thing*. Thus, for example, a certain colour, taste, smell, figure, and consistence having been observed to go together, are accounted one distinct thing, signified by the name apple; other collections of ideas constitute a stone, a tree, a book, and the like sensible things; which as they are pleasing or disagreeable excite the passions of love, hatred, joy, grief, and so forth. (Armstrong, 1965, p. 61)

Thus, the objects we name are aggregates of sensations that typically accompany each other. Like Locke, Berkeley accepted the law of contiguity as his associative principle. Unlike Locke, however, he did not focus on fortuitous or arbitrary associations. For Berkeley, *all* sensations that are consistently experienced together become associated. In fact, for Berkeley, objects were aggregates of sensations and nothing more.

Berkeley's Theory of Distance Perception. Berkeley agreed with Locke that if a person who was born blind was later able to see, he or she would not be able to distinguish a cube from a triangle. Such discrimination requires the association of visual and tactile experiences. Berkeley went further by saying that such a person would also be incapable of perceiving distance. The reason is the same. For the distance of an object to be judged properly, many sensations must be associated. For example, when viewing an object, the person receives tactile stimulation while walking to it. After several such experiences from the same and from different distances, the visual characteristics of an object alone suggest its distance. That is, when the object is small, it suggests great distance, and when large, it suggests a short distance. Thus, the cues for distance are learned through the process of association. Also, stimulation from other sense modalities becomes a cue for distance for the same reason. Berkeley gave the following example:

> Sitting in my study I hear a coach drive along the street; I look through the casement and see it; I walk out and enter into it. Thus, common speech would incline one to think I heard, saw, and touched the same thing, to wit, the coach. It is nevertheless certain the ideas intromitted by each sense are widely different, and distinct from each other; but, having been observed constantly to go together, they are spoken of as one and the same thing. By the variation of the noise, I perceive the different distances of the coach, and that it approaches before I look out. Thus, by the ear I perceive distance just after the same manner as I do by the eye. (Armstrong, 1965, pp. 302–303)

With his empirical theory of distance perception, Berkeley was refuting the theory held by Descartes and others that distance perception was based on the geometry of optics. According to the latter theory, a triangle is formed with the distance between the two eyes as its base and the object fixated on as its apex. A distant object forms a long, narrow triangle, and a nearby object forms a shorter, broader triangle. Also, the apex angle of the triangle will vary directly with the distance of the object attended to; the greater the distance, the greater the angle and vice versa. The convergence and divergence of the eyes are important to this theory, but only because it is such movement of the eyes that creates the geometry of distance perception.

According to Berkeley, the problem with the theory of distance perception based on "natural geometry" is that people simply do not perceive distance in that way. The convergence and divergence of the eyes were extremely important in Berkeley's analysis but not because of the visual angles that such movement created. Rather, they were important because the sensations caused by the convergence and divergence of the eyes became associated with other sensations that became cues for distance:

> And, *first*, it is certain by experience, that when we look at a near object with both eyes, according as it approaches or recedes from us, we alter the disposition of our

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> eyes, by lessening or widening the interval between the pupils. This disposition or turn of the eyes is attended with a sensation, which seems to me to be that which in this case brings the idea of greater or lesser distance into the mind. (Armstrong, 1965, p. 288)

The analysis of the perception of magnitude (size) is the same as for distance perception. In fact, the meaning that any word has is determined by the sensations that typically accompany that word.

> As we see distance so we see magnitude. And we see both in the same way that we see shame or anger, in the looks of a man. Those passions are themselves invisible; they are nevertheless let in by the eye along with colours and alterations of countenance which are the immediate object of vision, and which signify them for no other reason than barely because they have been observed to accompany them. Without which experience we should no more have taken blushing for a sign of shame than of gladness. (Armstrong, 1965, p. 309)

Berkeley's empirical account of perception and meaning was a milestone in psychology's history because it showed how all complex perceptions could be understood as compounds of elementary sensations such as sight, hearing, and touch. Atherton (1990) provides a more detailed account of Berkeley's theory of perception and a justification for referring to it as revolutionary.

David Hume

Born in Edinburgh, Scotland, **David Hume (1711–1776)** was educated at the University of Edinburgh, where he studied law and commerce but left without a degree. Given relative freedom by an inheritance, Hume moved to La Fleche in France, where Descartes had studied as a young man. It was at La Fleche that Hume, before the age of 28, wrote his most famous work, *Treatise of Human Nature, Being an Attempt to Introduce the Experimental Method of Reasoning into Moral Subjects*, the first volume of which was published in 1739 and the second volume in 1740. About his *Treatise*, Hume said, "It fell dead-born from the press, without reaching such distinction as even to excite a murmur among the zealots" (Flew, 1962, p. 305). In 1742 Hume published his *Philosophical Essays*, which was well received. Hume was always convinced that his *Treatise* was poorly received because of its manner of presentation rather than its content, and in 1748 he published an abbreviated version of the *Treatise* titled *An Enquiry Concerning Human Understanding*. Much of what follows is based on the posthumous 1777 edition of the *Enquiry*.

Unlike many of the other philosophers of his time, Hume was never a university professor. He worked briefly in commerce before becoming a private tutor, a librarian, and a professional secretary. He was nominated for an academic position twice, but the opposition of the Scottish clergy denied him the posts. Hume was skeptical of most religious beliefs, and friction with the church was a constant theme in his life. About religion Hume said, "The whole is a riddle, an enigma, an inexplicable mystery. Doubt, uncertainty, suspense of judgment appear the only result of our most accurate scrutiny, concerning the subject" (Yandell, 1990, p. xiv). Hume argued that religion was both irrational and impractical:

> In the first place, fear of God and the expectations of an afterlife have less day-to-day effect upon our conduct than is generally supposed. In the second place, religions do positive harm. They invent mortal sins like suicide, which have no natural depravity, and they create "frivolous merits" which partake in no natural good, like abstaining from certain foods or attending ceremonies. Moreover, … religions result in cruel persecutions, bigotry, strife between sects or between sects and civil power, and the hunting down of unorthodox opinions. (Gaskin, 1998, p. xvii)

Toward the end of his life, Hume left the manuscript for his *Dialogues Concerning Natural Religion* with his friend, the famous economist Adam Smith,

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with the understanding that Smith would arrange for its publication. However, when Hume died in 1776, Smith, perhaps fearing reprisal against himself, advised against the publication of the book. It did not appear until 1779, and then without the publisher's name (Steinberg, 1977).

Hume's Goal. According to Hume, "It is evident, that all the sciences have a relation, greater or less, to human nature; and that, however wide any of them may seem to run from it, they still return back by one passage or another" (Flew, 1962, p. 172). Under the heading of science, Hume included such topics as mathematics, natural philosophy (physical science), religion, logic, morals, criticism, and politics. In other words, as with Locke before, it was seen that all important matters reflect human nature, and understanding that nature is therefore essential. In developing his science of man, Hume followed in the empirical tradition of Occam, Bacon, Hobbes, Locke, and Berkeley: "As the science of man is the only solid foundation for the other sciences, so, the only solid foundation we can give to this science itself must be laid on experience and observation" (Flew, 1962, p. 173).

Hume, however, was very impressed by the achievements of Newtonian science, and he wanted to do for "moral philosophy" what Newton had done for "natural philosophy."

> Hume believed that he could bring about a reform in moral philosophy comparable to the Newtonian revolution in physics by following the very method of inquiry that Newton had followed. He aspired to be the Newton of the moral sciences. His achievement would in fact surpass Newton's. The science of man is not only the indispensable foundation of natural philosophy, but is also of "greater importance" and "much superior in utility."
> (E. F. Miller, 1971, p. 156)

In Hume's day, *moral philosophy* referred roughly to what we now call the social sciences, and *natural philosophy* referred to what we now call the physical sciences.

Besides being an empirical science, the science of man would also be an "experimental" science. Because experiments were so useful in the physical sciences, they would also be used in the science of man. However, Hume did not employ experiments in his science of man the same way that they were employed by physical scientists. For the physical scientists, an experiment involved purposely manipulating some environmental variable and noting the effect of that manipulation on another variable. Both variables were observable and measurable. As we will see, the major determinants of behavior in Hume's system were cognitive and not directly observable. For Hume, the term *experience* meant mental experience. What, then, could the term *experiment* mean to Hume? By *experiment*, Hume meant careful observation of how experiences are related to one another and how experience is related to behavior. Hume noted that his experimental science of human nature would be different from the physical sciences, but *different* did not mean "inferior."

Hume's goal, then, was to combine the empirical philosophy of his predecessors with the principles of Newtonian science and, in the process, create a science of human nature. It is ironic that with all of Hume's admiration for Newton, Hume tended to use the Baconian inductive method more so than the Newtonian deductive method. The major thrust of Hume's approach was to make careful observations

Portait Essentials/Alamy

David Hume

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and then carefully generalize from those observations. Hume occasionally did formulate a hypothesis and test it against experience, but his emphasis was clearly on induction rather than deduction.

Impressions and Ideas. Like the other empiricists that preceded him, Hume believed that the contents of the mind came only from experience. Also, like his predecessors, he believed that experience (perception) could be stimulated by either internal or external events. Hume agreed with Berkeley that we never experience the physical directly and can have only perceptions of it:

> It is a question of fact, whether the perceptions of the senses be produced by external objects, resembling them: How shall this question be determined? By experience surely; as all other questions of a like nature. But here experience is, and must be entirely silent. The mind has never any thing present to it but the perceptions, and cannot possibly reach any experience of their connexion with objects. The supposition of such a connexion is, therefore, without any foundation in reasoning. (Steinberg, 1977, p. 105)

Hume did not deny the existence of physical reality; he denied only the possibility of knowing it directly. Although the ultimate nature of physical reality must necessarily remain obscure, its existence, according to Hume, must be assumed in all rational deliberations: "Tis in vain to ask, Whether there be body or not? That is a point, which we must take for granted in all our reasonings" (Mossner, 1969, p. 238).

Hume distinguished between **impressions**, which were strong, vivid perceptions, and ideas, which were relatively weak perceptions:

> All the perceptions of the human mind resolve themselves into two distinct kinds, which I shall call *impressions* and *ideas*. The difference betwixt these consists in the degrees of force and liveliness, with which they strike upon the mind, and make their way into our thought or consciousness. Those perceptions which enter with most force and violence, we may name *impressions*; and, under this name, I comprehend all our sensations, passions, and emotions, as they make their first appearance in the soul. By *ideas*, I mean the faint images of these in thinking and reasoning. (Flew, 1962, p. 176)

Simple and Complex Ideas and the Imagination. Hume made the same distinction that Locke had made between simple ideas and complex ideas. Although, according to Hume, all simple ideas were once impressions, not all complex ideas necessarily correspond to complex impressions. Once ideas exist in the mind, they can be rearranged in an almost infinite number of ways by the **imagination**:

> Nothing is more free than the imagination of man; and though it cannot exceed that original stock of ideas, furnished by the internal and external senses, it has unlimited power of mixing, compounding, separating, and dividing these ideas, in all the varieties of fiction and vision. It can feign a train of events, with all the appearance of reality, ascribe to them a particular time and place, conceive them as existent, and paint them out to itself with every circumstance, that belongs to any historical fact, which it believes with the greatest certainty. Wherein, therefore, consists the difference between such a fiction and belief? It lies not merely in any peculiar idea, which is annexed to such a conception as commands our assent, and which is wanting to every known fiction. For as the mind has authority over all its ideas, it could voluntarily annex this particular idea to any fiction, and consequently be able to believe whatever it pleases; contrary to what we find by daily experience. We can, in our conception, join the head of a man to the body of a horse; but it is not in our

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> power to believe, that such an animal has ever really existed. (Steinberg, 1977, p. 31)

It is interesting to note that, for Hume, ideas that have been consistently experienced together create the *belief* that one will follow the other. Such beliefs, for us, constitute reality. Ideas simply explored by the imagination do not have a history of concordance, and therefore they do not elicit a strong belief that one belongs to the other (like a blue banana). What distinguishes fact from fantasy, then, is the degree of belief that one idea belongs with another, and such belief is determined only by experience.

Again, the contents of the mind come only from experience, but once in the mind, ideas can be rearranged at will. Therefore, we can ponder thoughts that do not necessarily correspond to reality. Hume gave the idea of God as an example: "The idea of God, as meaning an infinitely intelligent, wise, and good Being, arises from reflecting on the operations of our own mind, and augmenting, without limit, those qualities of goodness and wisdom" (Steinberg, 1977, p. 11).

To understand Hume, it is important to remember that all human knowledge is based on simple impressions. Hume stated this fact in the form of a general proposition: "That all our simple ideas in their first appearance, are derived from simple impressions, which are correspondent to them, and which they exactly represent" (Flew, 1962, p. 178).

The Association of Ideas. If ideas were combined only by the imagination, they would be "loose and unconnected," and chance alone would join them together. Also, the associations among ideas would be different for each person because there would be no reason for them to be similar. Hume, however, observed that this was not the case. Rather, a great deal of similarity exists among the associations of all humans, and this similarity must be explained.

Hume considered his account of the association of ideas as one of his greatest achievements: "If anything can entitle the author to so glorious a name as that of an 'inventor,' it is the use he makes of the principle of the association of ideas, which enters into most of his philosophy" (Flew, 1962, p. 302). Hume seems to have overlooked the fact that the laws of association go back at least as far as Aristotle and were employed by Hobbes, to a lesser extent by Locke, and extensively by Berkeley. It is true, however, that Hume depended on the principles of association to the point where his philosophy can be said to exemplify associationism. For Hume, the laws of association do not cement ideas together so that their association becomes immutable. As we have already seen, the imagination can reform the ideas in the mind into almost any configuration. Rather, Hume saw the laws of association as a "gentle force," which creates certain associations as opposed to others.

Hume discussed three laws of association that influence our thoughts. The **law of resemblance** states that our thoughts run easily from one idea to other similar ideas, such as when thinking of one friend stimulates the recollection of other friends. The **law of contiguity** states that when one thinks of an object, there is a tendency to recall other objects that were experienced at the same time and place as the object being pondered, such as when remembering a gift stimulates thoughts of the giver. The **law of cause and effect** states that when we think of an outcome (effect), we tend to also think of the events that typically precede that outcome, such as when we see lightning and consequently expect thunder. According to Hume, "There is no relation which produces a stronger connexion in the fancy, and makes one idea more readily recall another, than the relation of cause and effect betwixt their objects" (Mossner, 1969, pp. 58–59). Because Hume considered cause and effect to be the most important law of association, we will examine it in more detail.

Analysis of Causation. From the time of Aristotle through Scholasticism and to the science of Hume's day, it was believed that certain causes by their very nature produced certain effects. To make the statement "A causes B" was to state something of the essences of A and B; that is, there was assumed to be a natural relation between the two events so that knowing A would allow for the prediction of B. This prediction could be made from knowing the essences of A and B without having observed the

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two events together. Hume completely disagreed with this analysis of causation. For him, we can never know that two events occur together unless we have experienced them occurring together. In fact, for Hume, a causal relationship is a consistently observed relationship and nothing more. Causation, then, is not a logical necessity; it is a psychological experience.

It was not Hume's intention to deny the existence of causal relationships and thereby undermine science, which searches for them. Rather, Hume attempted to specify what is meant by a causal relationship and how beliefs in such relationships develop. Hume described the observations that need to be made in order to conclude that two events are causally related:

1. The cause and effect must be contiguous in space and time.
2. The cause must be prior to the effect.
3. There must be a constant union betwixt the cause and effect. It is chiefly this quality that constitutes the relation.
4. The same cause always produces the same effect, and the same effect never arises but from the same cause. (Flew, 1962, p. 216)

Thus, it is on the basis of consistent observations that causal inferences are drawn. Predictions based on such observations assume that what happened in the past will continue to happen in the future, but *there is no guarantee of that being the case.* What we operate with is the *belief* that relationships observed in the past will continue to exist in the future. Also, even if all conditions listed above are met, we could still be incorrect in drawing a causal inference, such as when we conclude that the sunset causes the sunrise because one always precedes the other and one never occurs without the other first occurring. According to Hume then, it is not rationality that allows us to live effective lives, it is cumulative experience, or what Hume called custom:

> Custom, then, is the great guide of human life. It is that principle alone, which renders our experience useful to us, and makes us expect, for the future, a similar train of events with those which have appeared in the past. Without the influence of custom, we should be entirely ignorant of every matter of fact, beyond what is immediately present to the memory and senses. We should never know how to adjust means to ends, or to employ our natural powers in the production of any effect. There would be an end at once of all action, as well as of the chief part of speculation. (Steinberg, 1977, p. 29)

Analysis of the Mind and the Self. As mentioned in Chapter 1, a persistent problem throughout psychology's history has been to account for the unity of experience. Although we are confronted with a myriad of changing situations, our experience maintains a continuity over time and across conditions. The entities that most often have been postulated to explain the unity of experience are a mind or a self.

All beliefs, according to Hume, result from recurring experiences and are explained by the laws of association. All metaphysical entities, such as God, soul, and matter, are products of the imagination as are the so-called laws of nature. Hume extended his skepticism to include the concept of mind that was so important to many philosophers, including Descartes, Locke, and Berkeley. According to Hume, the "mind" is no more than the perceptions we are having at any given moment: "We may observe, that what we call a *mind*, is nothing but a heap or collection of different perceptions, united together by certain relations, and suppos'd, tho' falsely, to be endow'd with a perfect simplicity and identity" (Mossner, 1969, p. 257).

Just as there is no mind independent of perceptions, there is also no self independent of perceptions:

> For my part, when I enter most intimately into what I call *myself*, I always stumble on some particular perception or other, of heat or cold, light or shade, love or hatred, pain or pleasure. I never can catch *myself* at any time without a perception, and never

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> can observe anything but the perception. When my perceptions are removed for any time, as by sound sleep, so long am I insensible of *myself*, and may truly be said not to exist. And were all my perceptions removed by death, and could I neither think, nor feel, nor see, nor love, nor hate, after the dissolution of my body, I should be entirely annihilated. (Flew, 1962, p. 259)

The Emotions and Behavior. Hume pointed out that throughout human history, humans have had the same passions (emotions) and that these passions have motivated similar behaviors:

> It is universally acknowledged, that there is a great uniformity among the actions of men, in all nations and ages, and that human nature remains still the same, in its principles and operations. The same motives always produce the same actions: The same events follow from the same causes. Ambition, avarice, self-love, vanity, friendship, generosity, public spirit; these passions, mixed in various degrees, and distributed through society, have been, from the beginning of the world, and still are, the source of all the actions and enterprises, which have ever been observed among mankind. (Steinberg, 1977, p. 55)

Hume noted that even though all humans possess the same passions, they do not do so in the same degree and, because different individuals possess different patterns of passions, they will respond differently to situations. The pattern of passions that a person possesses determines his or her *character*, and it is character that determines behavior. It is a person's character that allows for his or her consistent interactions with people. It is through individual experience that certain impressions and ideas become associated with certain emotions. It is the passions elicited by these impressions and ideas, however, that will determine one's behavior. This is another application of the laws of association, only in this case the associations are between various experiences and the passions and between passions and behavior. In general, we can say that individuals will seek experiences associated with pleasure and avoid experiences associated with pain.

The fact that human behavior is at times inconsistent does not mean that it is free any more than the weather being sometimes unpredictable means that the weather is free:

> The internal principles and motives may operate in a uniform manner, notwithstanding these seeming irregularities; in the same manner as the winds, rain, clouds, and other variations of the weather are supposed to be governed by steady principles; though not easily discoverable by human sagacity and enquiry. (Steinberg, 1977, p. 58)

Humans learn how to act in different circumstances the same way that nonhuman animals do—through the experience of reward and punishment. In both cases, reasoning ability has nothing to do with it:

> This is … evident from the effects of discipline and education on animals, who, by the proper application of rewards and punishments, may be taught any course of action, the most contrary to their natural instincts and propensities. Is it not experience, which renders a dog apprehensive of pain, when you menace him, or lift up the whip to beat him? Is it not even experience, which makes him answer to his name, and infer, from such an arbitrary sound, that you mean him rather than any of his fellows, and intend to call him, when you pronounce it in a certain manner, and with a certain tone and accent? … Animals, therefore, are not guided in these inferences by reasoning: Neither are children: Neither are the generality of mankind, in their ordinary actions and

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> conclusions: Neither are philosophers themselves, who, in all the active parts of life, are, in the main, the same with the vulgar, and are governed by the same maxims. (Steinberg, 1977, pp. 70–71)

It is not ideas or impressions that cause behavior but the passions associated with those ideas or impressions. It is for this reason that Hume said, "We speak not strictly and philosophically when we talk of the combat of passion and of reason. Reason is, and ought only to be the slave of the passions, and can never pretend to any other office than to serve and obey them" (Mossner, 1969, p. 462).

Hume's Influence. Like Locke, Hume vastly increased the importance of what we now call psychology. In fact, he reduced politics, philosophy, religion, and science to psychology. Everything that humans know is learned from experience. All beliefs are simply expectations that events that have been correlated in the past will remain correlated in the future. Such beliefs are not rationally determined, nor can they be rationally defended. They result from experience, and we can have faith only that what we learned from experience will be applicable to the future. According to Hume then, humans can be certain of nothing. It is for this reason that Hume is sometimes referred to as the supreme Skeptic.

Hume accepted only two types of knowledge: demonstrative and empirical. *Demonstrative knowledge* relates ideas to ideas such as in mathematics. Such knowledge is true only by accepted definitions and does not necessarily say anything about facts or objects outside the mind. Demonstrative knowledge is entirely abstract and entirely the product of the imagination. This is not to say that demonstrative knowledge is useless, because the relations gleaned in arithmetic, algebra, and geometry are of this type and represent clear and precise thinking. Such knowledge, however, is based entirely on deduction from one idea to another; therefore, it does not necessarily say anything about empirical events. Conversely, *empirical knowledge* is based on experience, and it alone can furnish knowledge that can effectively guide our conduct in the world. According to Hume, for knowledge to be useful, it must be either demonstrative or empirical; if it is neither, it is not real knowledge and therefore is useless:

> When we run over libraries, persuaded of these principles, what havoc must we make? If we take in our hand any volume; of divinity or school metaphysics, for instance; let us ask, *Does it contain any abstract reasoning concerning quantity or number?* No. *Does it contain any experimental reasoning concerning matter of fact and existence?* No. Commit it then to the flames: For it can contain nothing but sophistry and illusion. (Steinberg, 1977, p. 114)

Hume's insistence that all propositions must be either demonstrably or empirically true places him clearly in the positivistic tradition of Bacon. We will have more to say about positivism later in this chapter.

David Hartley

David Hartley (1705–1757), the son of a clergyman, had completed his training as a minister at the University of Cambridge before an interest in biology caused him to seek a career as a physician. Hartley remained deeply religious all his life, believing that understanding natural phenomena increased one's faith in God. It took several years for Hartley to write his long and difficult *Observations on Man, His Frame, His Duty, and His Expectations* (1749). This ponderous book is divided into two parts; the first part (concerning the human frame) contains his contributions to psychology, and the second (concerning the duty and expectations of humans) is almost totally theological.

Hartley's Goal. Although Hartley's *Observations* appeared several years after Hume's *Treatise on Human Nature* (1739–1740), Hartley had been working on his book for many years and appears not to have been influenced by Hume. His two major influences were Locke and Newton. Hartley accepted Newton's contention that nerves are solid

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Courtesy of the National Library of Medicine

David Hartley

(not hollow, as Descartes had believed) and that sensory experience caused vibrations in the nerves. These vibrations were called *impressions*. The impressions reach the brain and cause vibrations in the "infinitesimal, medullary particles," which cause *sensations*. Newton had also observed that vibrations in the brain show a certain inertia; that is, they continue vibrating after the impressions causing them cease. This, according to Newton, was why we see a whirling piece of coal as a circle of light. For Hartley, it was the lingering vibrations in the brain following a sensation that constituted ideas. Ideas, then, were faint replications of sensations. Hartley's goal was to synthesize Newton's conception of nerve transmission by vibration with previous versions of empiricism, especially Locke's. This union of the most pressing questions of philosophy and the most contemporary ideas of physiology would become a hallmark of psychology.

Hartley's Explanation of Association. As we have seen, Hartley believed that sense impressions produced vibrations in the nerves, which traveled to the brain and caused similar vibrations in the "medullary substance" of the brain. The brain vibrations caused by sense impressions give rise to sensations. After sense impressions cease, there remain in the brain diminutive vibrations that Hartley called **vibratiuncles**. It is the vibratiuncles that correspond to ideas. Ideas, then, are weaker copies of sensations. Vibratiuncles are like the brain vibrations associated with sensations in every way except they (the vibratiuncles) are weaker. So much for how sense impressions cause ideas; now the question is, How do ideas become associated?

> Any Sensations *A, B, C*, [etc.] by being associated with one another a sufficient Number of Times, get such a Power over the corresponding Ideas *a, b, c*, [etc.] that any one of the Sensations *A*, when impressed alone, shall be able to excite in the Mind, *b, c*, [etc.] the Ideas of the rest. (Hartley, 1749/1834, p. 41)

Hartley's notion that experiences consistently occurring together are recorded in the brain as an interrelated package and that experiencing one element in the package will make one conscious of the entire package is remarkably modern as we will see with Donald Hebb in Chapter 18.

Although Hartley distinguished between simultaneous and successive associations, both are examples of the *law of contiguity*. Successive experiences follow each other closely in time, and simultaneous events occur at the same time; both exemplify a type of contiguity. What made Hartley's account of association significantly different from previous accounts was his attempt to correlate all mental activity with neurophysiological activity.

Unlike Locke, who believed that complex ideas are formed from simple ideas via reflection, Hartley believed that all complex ideas are formed automatically by the process of association. For Hartley, there were no active mind processes involved at all. Simple ideas that are associated by contiguity form complex ideas. Similarly, complex ideas that are associated by contiguity become associated into "decomplex" ideas. As simple ideas combine into complex ideas and complex ideas combine to form decomplex ideas, it may be difficult to remember the individual sensations that make up such ideas. However, for Hartley, all

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ideas, no matter how complex, are made up of sensations. Furthermore, association is the *only* process responsible for converting simple ideas into complex ones.

Laws of Association and Behavior. Hartley attempted to show that so-called voluntary behavior developed from involuntary, or reflexive, behavior. He used the law of association to explain how involuntary behavior gradually becomes voluntary and then becomes almost involuntary (automatic) again. Involuntary behavior occurs automatically (reflexively) in response to sensory stimulation. Voluntary behavior occurs in response to one's ideas or to stimuli not originally associated with the behavior, and voluntary behavior itself can become so habitual that it too becomes automatic, not unlike involuntary behavior. The basic assumption in Hartley's explanation is that all behavior is at first involuntary and gradually becomes voluntary through the process of association. In the following example, we can see that Hartley's (1749/1834) explanation of the development of voluntary behavior comes very close to what was later called a conditioned reflex:

> The fingers of young children bend upon almost every impression which is made upon the palm of the hand, thus performing the action of grasping, in the original automatic manner. After a sufficient repetition of the motory vibrations which concur in this action, their vibratiuncles are generated, and associated strongly with other vibrations or vibratiuncles, the most common of which, I suppose, are those excited by the sight of a favourite plaything which the child uses to grasp, and hold in his hand. He ought, therefore, according to the doctrine of association, to perform and repeat the action of grasping, upon having such a plaything presented to his sight. But it is a known fact, that children do this. By pursuing the same method of reasoning, we may see how, after a sufficient repetition of the proper associations, the sound of the words *grasp, take hold*, [etc.] the sight of the nurse's hand in a state of contraction, the idea of a hand, and particularly of the child's own hand, in that state, and innumerable other associated circumstances, *i.e.* sensations, ideas, and motions, will put the child upon grasping, till, at last, that idea, or state of mind which we may call the will to grasp, is generated, and sufficiently associated with the action to produce it instantaneously. It is therefore perfectly voluntary in this case; and, by the innumerable repetitions of it in this perfectly voluntary state, it comes, at last, to obtain a sufficient connection with so many diminutive sensations, ideas, and motions, as to follow them in the same manner as originally automatic actions do the corresponding sensations, and consequently to be automatic secondarily. And, in the same manner, may all the actions performed with the hands be explained, all those that are very familiar in life passing from the original automatic state through the several degrees of voluntariness till they become perfectly voluntary, and then repassing through the same degrees in an inverted order, till they become secondarily automatic on many occasions, though still perfectly voluntary on some, *viz.* whensoever an express act of the will is exerted. (pp. 66–67)

Thus, behavior is first involuntary, and then it becomes increasingly voluntary as, through the process of association, more and more stimuli become capable of eliciting the behavior. Finally, when performing the voluntary action becomes habitual, it is said to be "secondarily automatic." It should be clear that Hartley did not employ the term *voluntary* to mean "freely chosen." For him, voluntary behavior is determined by the law of contiguity and, therefore, no free choice is involved. We see in Hartley's explanation much that would later become part of modern learning theory.

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Hartley's Influence. It was Hartley's disciple Joseph Priestley (1733–1804), the famous chemist and codiscoverer of oxygen, who explored the implications of Hartley's analysis for education. Priestley also wrote *Hartley's Theory of the Human Mind: On the Principle of the Association of Ideas* (1775), which did much to promote the popularity of Hartley's ideas.

Hartley took the speculations concerning neurophysiology of his time and used them in his analysis of association. His effort was the first major attempt to explain the neurophysiology of thought and behavior since Descartes. The neurophysiological mechanisms that Hartley postulated were largely wrong, but as more became known about neural transmission and brain mechanisms, the more accurate information replaced the older fictions. Thus, Hartley started the search for the biological correlates of mental events that has continued to the present.

Earlier in this chapter, associationism was defined as any psychological theory that has association as its fundamental principle. Under this definition, neither Hobbes's nor Locke's philosophies qualify. Hume probably qualifies, but "Hartley … was the first man to whom the term associationist can be applied without qualification" (Drever, 1968, p. 14). Hartley's brand of associationism became highly influential and was the authoritative psychological account for about 80 years, or until the time of James Mill.

James Mill

James Mill (1773–1836), a Scotsman, was educated for the ministry at the University of Edinburgh. In 1802 he moved to London to start a literary career, becoming editor of the *Literary Journal* and writing for various periodicals. With the publication of perhaps his greatest tome, *The History of British India*, which he began writing in 1806 and finished in 1817, Mill entered a successful career with the East India Company. Mill's most significant contribution to psychology was *Analysis of the Phenomena of the Human Mind*, which originally appeared in 1829 and was revised under the editorship of his son John Stuart Mill in 1869. We use the 1869 edition of *Analysis* as our primary source of Mill's ideas. Mill's *Analysis* is regarded as the most complete summary of associationism ever offered.

Mill's Analysis of Association. Following Hartley, Mill attempted to show that the mind consisted of only sensations and ideas held together by contiguity. Also following Hartley, Mill said that complex ideas are composed of simple ideas. However, when ideas are continuously experienced together, the association among them becomes so strong that they appear in consciousness as one idea:

> The word gold, for example, or the word iron, appears to express as simple an idea, as the word colour, or the word sound. Yet it is immediately seen, that the idea of each of those metals is made up of the separate ideas of several sensations; colour, hardness, extension, weight. Those ideas, however, present themselves in such intimate union, that they are constantly spoken of as one, not many. We say, our idea of iron, our idea of gold; and it is only with an effort that reflecting men perform the decomposition.… It is to this great law of association, that we trace the formation of our ideas of what we call external objects; that is, the ideas of a certain number of sensations, received together so frequently that they coalesce as it were, and are spoken of under the idea of unity. Hence, what we call the idea of a tree, the idea of a stone, the idea of a horse, the idea of a man. (J. S. Mill, 1869/1967, pp. 91–93)

In fact, all things we refer to as external objects are clusters of sensations that have been consistently experienced together. In other words, they are complex ideas and, as such, are reducible to simple ideas.

Mill explicitly pointed out what was more implicit in the philosophies of other "Newtonians of the mind," like Locke, Berkeley, Hume, and Hartley. That is, no matter how complex an idea

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becomes, it can always be reduced to the simple ideas of which it is constructed. Simple ideas can be added to other simple ideas, making a complex idea; complex ideas can be added to complex ideas, making a still more complex idea; and so forth. Still, at the base of all mental experience are sensations and the ideas they initiate.

Mill believed that two factors caused variation in strengths of associations: *vividness* and *frequency*. That is, the more vivid sensations or ideas form stronger associations than less vivid ones do; and more frequently paired sensations and ideas form stronger associations than do those paired less frequently. Mill referred to frequency or repetition as "the most remarkable and important cause of the strength of our associations" (J. S. Mill, 1869/1967, p. 87).

As far as vividness is concerned, Mill said that (1) sensations are more vivid than ideas, and therefore the associations between sensations are stronger than those between ideas; (2) sensations and ideas associated with pleasure or pain are more vivid and therefore form stronger associations than sensations and ideas not related to pleasure or pain; and (3) recent ideas are more vivid and therefore form stronger associations than more remote ideas.

Utilitarianism and Associationism. In 1808, James Mill met **Jeremy Bentham (1748–1832)**, and the two became close, lifelong friends. Bentham was the major spokesman for the British political and ethical movement called **utilitarianism**. Bentham rejected all metaphysical and theological arguments for government, morality, and social institutions and instead took the ancient concept of hedonism (from the Greek word *hedone*, meaning "pleasure") and made it the cornerstone of his political and ethical theory:

> Nature has placed mankind under the governance of two sovereign masters, *pain* and *pleasure*. It is for them alone to point out what we ought to do, as well as to determine what we shall do. On the one hand the standard of right and wrong, on the other the chain of causes and effects, are fastened to their throne. They govern us in all we do, in all we say, in all we think: every effort we can make to throw off their subjection will serve but to demonstrate and confirm it. (Bentham, 1781/1988, p. 1)

Thus, Bentham defined human happiness entirely in terms of the ability to obtain pleasure and avoid pain. One could approach ethical matters using a sort of hedonic calculus—that is, by calculating the pleasures and pains involved in order to determine the correct action. Similarly, the best government was defined as one that brought the greatest amount of happiness to the greatest number of people. Although utilitarianism was implicit in the philosophies of a number of earlier thinkers, it was Bentham who applied hedonism to society as a whole. Bentham's efforts were highly influential and resulted in a number of reforms in legal and social institutions.

Bentham was a fascinating fellow, who entered Queen's College at Oxford at age 12, earning his bachelor's degree at 15, and a master's by 18. If you have had a philosophy course you may recall that his utilitarian approach, along with the axiomatic approach of Kant (who we will consider in the

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Jeremy Bentham

next chapter), forms the basis of almost all modern approaches to ethics.

A lifelong eccentric, Bentham's will called for his public dissection and subsequent mummification. Both directly and indirectly, Bentham is also associated with the creation of the University College of London, where his remains are on display in a special cabinet called the Auto-Icon. On select occasions, his Auto-Icon joins meetings of the ruling College Council, where he is listed as "present but not voting."

James Mill's Influence. Mill's *Analysis* is regarded as the most complete summary of associationism. As we have seen, he attempted to show that the mind consisted of only sensations and ideas held together by contiguity. He insisted that any mental experience could be reduced to the simple ideas that made it up. Thus, he gave us a conception of the mind based on Newtonian physics. For Newton, the universe could be understood as consisting of material elements held together by physical forces and behaving in a predictable manner. For Mill, the mind consisted of mental elements held together by the laws of association; therefore, mental experience was as predictable as physical events.

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James Mill

James Mill added nothing new to associationism. His professed goal was to provide the details of associationism that were lacking in Hartley's account. This he did, and in so doing, he carried associationism to its logical conclusion. In any case, the mind as viewed by Mill (and by Hartley) was completely passive; that is, it had no creative abilities. Association was the only process that organized ideas, and it did so automatically. This conception of the mind essentially ended with James Mill. In fact, James Mill's son John Stuart Mill was among the first to revise the purely mechanistic, elementistic view of his father.

John Stuart Mill

James Mill's interest in psychology was only secondary. He was a social reformer and, like the earlier empiricists, he believed social, political, and educational change is best facilitated by an understanding of human nature. He believed that utilitarianism, coupled with associationism, justified a radical, libertarian political philosophy. James Mill and his followers were quite successful in bringing about substantial social change. He also tried his theory of human nature on a smaller, more personal scale by using it as a guide in rearing his son **John Stuart Mill (1806–1873)**.

James Mill's attempt at using associative principles in raising his son must have been at least partially successful because John Stuart had learned Greek by the time he was three years old, Latin and algebra by age 8, and formal logic by age 12. Perhaps as a result of his father's intense educational practices, J. S. Mill also suffered several bouts of depression in his lifetime. Or, perhaps it was also because, as he noted in his autobiography (1873/1969), his parents lacked tenderness toward each other and their children. However, J. S. Mill himself was able to have at least one loving relationship. He met Harriet Taylor when he was 25 and she was 23. At the time, Harriet was married with two children, and for more than 20 years J. S. Mill's relationship with Harriet was close but platonic. In 1851, two years after Harriet was widowed, she and J. S. Mill were married. Alas, Harriet died just seven years later at the age of 50.

J. S. Mill's most famous work was *A System of Logic, Ratiocinative and Inductive: Being a Connected View of the Principles of Evidence, and the Methods of Scientific Investigation* (1843). This book was an immediate success, went through eight editions in Mill's lifetime, and remained a best seller throughout the 19th century. Mill's book was considered must reading for any late-19th-century scientist. The following summary of Mill's work uses the eighth edition of his *System of Logic*, which appeared in 1874. In his *An Examination of Sir William Hamilton's Philosophy* (1865), J. S. Mill responded to criticisms of his philosophy and elaborated and defended the views of human nature he had presented in his *System of Logic*. In 1869 he published a new edition of his father's *Analysis*, adding numerous footnotes of his own that extended and clarified his father's views on associationistic psychology and sometimes criticized his father's ideas.

J. S. Mill did as much as anyone at the time to facilitate the development of psychology as a science. This he did by describing the methodology that could be used in a science of human nature. In fact, he believed that the lawfulness of human thought, feeling, and action was entirely conducive to scientific inquiry.

Mental Chemistry Versus Mental Physics. In most important respects, J. S. Mill accepted his father's brand of associationism. J. S. Mill believed that (1) every sensation leaves in the mind an idea that resembles the sensation but is weaker in intensity (J. S. Mill called ideas secondary mental states, sensations being primary); (2) similar ideas tend to excite one another (James Mill had reduced the law of similarity to the law of frequency, but J. S. Mill accepted it as a separate law); (3) when sensations or ideas are frequently experienced together, either simultaneously or successively, they become associated (law of contiguity); (4) more vivid sensations or ideas form stronger associations than do less vivid ones; and (5) strength of association varies with frequency of occurrence. With only the minor exception of the law of similarity, this list summarizes James Mill's notion of "mental physics" or "mental mechanics."

John Stuart took issue with his father on one important point, however. Instead of agreeing that complex ideas are *always* aggregates of simple ideas, he proposed a type of **mental chemistry**. He was impressed by the fact that chemicals often combine and produce something entirely different from the elements that made them up, such as when hydrogen and oxygen combine to produce water. Also, Newton had shown that when all the colors of the spectrum were combined, white light was produced. J. S. Mill believed that the same kind of thing happens in the mind. That is, it was possible for elementary ideas to fuse and to produce an idea that was different from the elements that made it up.

J. S. Mill's contention that an entirely new idea, one not reducible to simple ideas or sensations, could emerge from contiguous experiences, emancipated associationistic psychology from the rigid confines of mental mechanics. However, if one is seeking an active, autonomous mind, one must look elsewhere. When a new idea does emerge from the synthesis of contiguous ideas or sensations, it does so automatically. Just as the proper combination of hydrogen and oxygen cannot help but become water, a person experiencing the rapid, successive presentation of the primary colors cannot help but experience white. Certainly, the observation that sometimes a phenomenon akin to mental chemistry occurred did nothing to dampen Mill's enthusiasm over the development of a science of human nature (psychology).

Toward a Science of Human Nature. Others before him (such as Locke, Hume, and Hartley) had as their goal the creation of a mental science on par with the natural sciences. It was J. S. Mill, however, speaking from the vantage point of perhaps the most respected philosopher of science of his day, who contributed most to this development of psychology as a science.

J. S. Mill began his analysis by attacking the common belief that human thoughts, feelings, and actions are not subject to scientific investigation in the same way that physical nature is. He stressed the point that any system governed by laws is subject to scientific scrutiny, and this is true even if those laws

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John Stuart Mill

are not presently understood. Mill gave the example of meteorology. He indicated that no one would disagree that meteorological phenomena are governed by natural laws, and yet such phenomena cannot be predicted with certainty, only probabilistically. Even though a number of the basic laws governing weather are known (such as those governing heat, electricity, vaporization, and elastic fluids), a number are still unknown. Also, observing how all causes of weather interact to cause a meteorological phenomenon at any given time is extremely difficult, if not impossible. Thus, meteorology is a science because its phenomena are governed by natural laws, but it is an inexact science because knowledge of those laws is incomplete and measurement of particular manifestations of those laws is difficult.

Sciences, then, can range from those whose laws are known and the manifestations of those laws easily and precisely measured to those whose laws are only partially understood and the manifestations of those laws measured only with great difficulty. In the latter category, Mill placed sciences whose **primary laws** are known and, *if no other causes intervene*, whose phenomena can be observed, measured, and predicted precisely. However, **secondary laws** often interact with primary laws, making precise understanding and prediction impossible. Because the primary laws are still operating, the overall, principal effects will still be observable, but the secondary laws create variations and modifications that cause predictions to be probabilistic rather than certain. Mill (1843/1874) gave the example of tidology:

> It is thus, for example, with the theory of the tides.… As much of the phenomena as depends on the attraction of the sun and moon is completely understood, and may, in any, even unknown, part of the earth's surface, be foretold with certainty; and the far greater part of the phenomena depends on those causes. But circumstances of a local or causal nature, such as the configuration of the bottom of the ocean, the degree of confinement from shores, the direction of the wind, etc., influence, in many or in all places, the height and time of the tide; and a portion of these circumstances being either not accurately knowable, not precisely measurable, or not capable of being certainly foreseen, the tide in known places commonly varies from the calculated result of general principles by some difference.… Nevertheless, not only is it certain that these variations depend on causes, and follow their causes by laws of unerring uniformity.… General laws may be laid down respecting the tides, predictions may be founded on those laws, and the result will in the main, though often not with complete accuracy, correspond to the predictions. (p. 587)

Thus, meteorology and tidology are sciences, but they are not *exact* sciences. An inexact science, however, might become an exact science. For example, astronomy became an exact science when the laws governing the motions of astronomical bodies became sufficiently understood to allow prediction of not only the general courses of such bodies but also apparent aberrations. It is the inability of a science to deal with secondary causation that makes it inexact.

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Mill viewed the science of human nature (psychology) as roughly in the same position as tidology. The thoughts, feelings, and actions of individuals cannot be predicted with great accuracy because we cannot foresee the circumstances in which individuals will be placed. This in no way means that human thoughts, feelings, and actions are not caused; it means that the primary causes of thoughts, feelings, and actions interact with a large number of secondary causes, making accurate prediction extremely difficult. However, the difficulty is understanding and predicting the *details* of human behavior and thought, not predicting its more global features. Just as with the tides, human behavior is governed by a few primary laws, and that fact allows for the understanding and prediction of general human behavior, feeling, and thought.

What the science of human nature has then is a set of primary laws that apply to all humans and that can be used to predict general tendencies in human thought, feeling, and action. What the science of human behavior does *not* have is a knowledge of how its primary laws interact with secondary laws (individual characters and circumstances) to result in specific thoughts, feelings, and actions. Mill believed that it would just be a matter of time before "corollaries" would be deduced from the primary (universal) laws of human nature, which would allow for more refined understanding and prediction of human thought, feeling, and action. What are these primary (universal) laws of human nature on which a more exact science of human nature will be deduced? They are the laws of the mind by which sensations cause ideas and by which ideas become associated. In other words, they are the laws established by the British empiricists, in general, but more specifically by Hume, Hartley, and of course James Mill. And, what J. S. Mill added, the notion of mental chemistry.

J. S. Mill's Proposed Science of Ethology. In Chapter 5, Book VI, of his *System of Logic*, Mill argued for the development of a "science of the formation of character," and he called this science ethology. It should be noted that Mill's proposed science of ethology bore little resemblance to modern ethology, which studies animal behavior in the animal's natural habitat and then attempts to explain that behavior in evolutionary terms (as we will see in Chapter 18). As Mill saw it, ethology would be derived from a more basic science of human nature. That is, first the science of human nature (psychology) would discover the universal laws according to which all human minds operate, and then ethology would explain how individual minds or characters form under specific circumstances. Putting the matter another way, we can say that the science of human nature provides information concerning what all humans have in common (human nature), and ethology explains individual personalities (individual differences).

What Mill was seeking, then, was the information necessary to convert psychology from an inexact science, like tidology, into an exact science. In other words, he wanted to explain more than general tendencies; he also wanted to explain the subtleties of individual behavior in specific circumstances.

It is interesting that Mill did little more than outline his ideas for ethology. He never personally attempted to develop such a science himself, and although most other sections of his *System of Logic* were substantially revised during its many editions, the section on ethology was never developed further or substantially modified. According to Leary (1982), Mill's attempt to develop a science of ethology failed because the science of human nature from which it was to be deduced was itself inadequate. Mill's theory of human nature was excessively intellectual. That is, it stressed how ideas become associated. It is difficult to imagine how something like character (personality), which to a large extent is emotional, could be deduced from a philosophy stressing the association of ideas. Eventually, Mill's ethology reemerged in France as the study of individual character. The French approach placed greater emphasis on emotional factors than Mill and his followers had, and their approach was somewhat more successful.

Social Reform. Like his father, J. S. Mill was a dedicated social reformer. His causes included freedom of speech, representative government, and the emancipation of women. He began his book

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The Subjection of Women (1861/1986) with the following statement:

> The object of this Essay is to explain, as clearly as I am able, the grounds of an opinion which I have held from the very earliest period when I had formed any opinions at all on social or political matters, and which, instead of being weakened or modified, has been constantly growing stronger by the progress of reflection and the experience of life: That the principle which regulates the existing social relations between the two sexes—the legal subordination of one sex to the other—is wrong in itself, and now one of the chief hindrances to human improvement; and that it ought to be replaced by a principle of perfect equality, admitting no power or privilege on the one side, nor disability on the other. (p. 7)

J. S. Mill went on to note that male chauvinism was often defended on the basis of natural law (females are biologically inferior to males) or on the basis of some religious belief or another. Mill considered both defenses invalid and believed that a sound science of human nature (psychology) would provide the basis for social equality. Sexism, he said, would fall "before a sound psychology, laying bare the real root of much that is bowed down to as the intention of nature and the ordinance of God" (1861/1986, p. 10). As might be expected, Mill's book was met with considerable (male) hostility.

Like his father, J. S. Mill embraced Bentham's utilitarianism: One should always act in a way that brings the greatest amount of pleasure (happiness) to the greatest number of people. This principle should consider both short- and long-term pleasure and treat the happiness of others as equal in value to our own. Societies can be judged by the extent to which they allow the utilitarian principle to operate.

Although J. S. Mill accepted Bentham's general principle of utilitarianism, his version of it differed significantly from Bentham's. In Bentham's calculation of happiness, all forms of pleasure counted equally. For example, sublime intellectual pleasures counted no more than eating a good meal. J. S. Mill disagreed, saying that, for most humans, intellectual pleasures were far more important than the biological pleasures we share with nonhuman animals. J. S. Mill said, "It is better to be a human dissatisfied than a pig satisfied; better to be Socrates dissatisfied than a fool satisfied" (1861/1979, p. 10).

Alexander Bain

Born in Aberdeen, Scotland, **Alexander Bain (1818–1903)** was a precocious child whose father was a weaver; from an early age, Bain himself had to work at the loom to earn money for his education. He was fortunate to be living in perhaps the only country (Scotland) where, at the time, any student showing intellectual promise was provided a university education. He attended Marischal College, which in 1858 became the University of Aberdeen. Following graduation, Bain moved to London, where he worked as a freelance journalist. While in London, Bain joined a lively intellectual circle, which included John Stuart Mill, and the two became close friends. The year before J. S. Mill published his famous *System of Logic* (1843), Bain assisted him with the revision of the manuscript. Bain also helped J. S. Mill with the annotation of the 1869 edition of James Mill's *Analysis*. In addition, Bain wrote biographies of both James and J. S. Mill.

While in London, Bain tried repeatedly to obtain a university appointment but without success. He finally distinguished himself, however, with the publication of his two classic texts: *The Senses and the Intellect* (1855) and *Emotions and the Will* (1859). These were to be a two-volume work published together, but the publisher delayed publishing the second volume (*Emotions*) for four years because the first volume sold poorly. In any case, in 1860 at the age of 42, with his reputation established, he finally obtained an academic post at the University of Aberdeen. He returned to his alma mater as a professor of logic and rhetoric; he remained there, in this and a variety of honorary positions, for the remainder of his long, productive life.

Bain is often referred to as the first true psychologist. His books *The Senses* and *Emotions* are considered by some as the first systematic textbooks on psychology. These books underwent three revisions each and were standard texts in psychology on both sides of the Atlantic for nearly 50 years. Besides writing these early texts in psychology, Bain was also the first to write a book exclusively dedicated to the relationship between the mind and the body (*Mind and Body*, 1873); and in 1876 he founded *Mind*, which is generally considered the first journal devoted primarily to psychological questions—and it remains one of the most prestigious journals in philosophical psychology even today.

Like Hartley before him, and many that would follow, Bain's primary goal was to describe the physiological correlates of mental and behavioral phenomena. In preparation for writing *The Senses*, Bain made it a point to digest the most current information on neurology, anatomy, and physiology. He then attempted to show how these biological processes were related to psychological processes. His text was modern in the sense that it started with a chapter on neurology, a practice many psychology textbooks have followed since.

After Bain, exploring the relationships between physiological and psychological processes became an integral part of psychology. Bain was the first to attempt to relate real physiological processes to psychological phenomena. Hartley had earlier attempted to do this, but his physiological principles were largely imaginary constructs.

Laws of Association. For Bain, the mind had three components: feeling, volition, and intellect. The intellect was explained by the laws of association. Like the other British empiricists, Bain stressed the law of contiguity as the basic associative principle. According to Bain (1855/1977a), the law of contiguity applied to sensations, ideas, actions, and feelings:

> Actions, sensations, and states of feeling, occurring together or in close succession, tend to grow together, or cohere, in such a way that, when any one of them is afterwards presented to the mind, the others are apt to be brought up in idea. (p. 318)

As was common among the British empiricists, Bain supplemented the law of contiguity with the law of frequency. What was unusual about Bain's presentations of the laws of contiguity and frequency was his suggestion that both laws had their effects because of neurological changes, or what we would now call changes in the synapses between neurons: "For every act of memory, every exercise of bodily aptitude, every habit, recollection, train of ideas, there is a specific grouping, or co-ordination, of sensation and movements, by virtue of specific growth in the cell junctions" (Bain, 1873/1875, p. 91). Given our modern understanding of neurotransmitters, Bain seems to have been on to something.

Like John Stuart Mill, Bain also accepted the law of similarity as one of his associative principles. Whereas the law of contiguity associates events that are experienced at the same time or in close succession, the law of similarity explains why events separated in time can come to be associated. That is, the experience of an event elicits memories of similar events even if those similar events were experienced under widely different times and circumstances.

To the traditional laws of association, Bain added two of his own: the law of compound association and the law of constructive association. The **law of compound association** states that associations are seldom links between one idea and another. Rather, an idea is usually associated with several other ideas either through contiguity or similarity. When this is true, we have a compound association. With such associations, sometimes experiencing one element, or perhaps even a few elements, in the compound will not be enough to elicit the associated idea. However, if the idea is associated with many elements and several of those elements are present, the associated idea will be recalled. Bain thought that this law suggested a way to improve memory and recall: "Past actions, sensations, thoughts, or emotions, are recalled more easily, when associated either through contiguity or through similarity, with *more than one* present object or impression" (1855/1977a, p. 545).

With his **law of constructive association**, Bain inserted a creative element into associationism in much the way Hume had done. In discussing his law of constructive association, Bain said,

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"By means of association the mind has the power to form new combinations or aggregates *different* from any that have been presented to it in the course of experience" (Bain, 1855/1977a, p. 571). In other words, the mind can rearrange memories of various experiences into an almost infinite number of combinations. Bain thought that the law of constructive association accounted for the creativity shown by poets, artists, inventors, and the like.

Voluntary Behavior. In his analysis of **voluntary behavior**, Bain made an important distinction between reflexive behavior and **spontaneous activity**. Reflexive behavior occurred automatically in response to some external stimulus because of the structure of an organism's nervous system. Conversely, organisms sometimes simply act spontaneously. In the terminology of modern Skinnerians, Bain was saying that some behavior is emitted rather than elicited.

Spontaneous activity is one ingredient of voluntary behavior; the other ingredient is hedonism. Like both Mills, Bain was also strongly influenced by Jeremy Bentham. Bain accepted the fundamental importance of pleasure and pain in his psychology and especially in his analysis of voluntary behavior. Apparently, the thought of combining spontaneous behavior and the emotions of pleasure and pain in his analysis first occurred to Bain when, while accompanying a shepherd, he observed the first few hours of the life of a lamb. He noted that the lamb's initial movements appeared to be completely random relative to its mother's teat, but as chance contact occurred with the mother's skin and eventually with her teat, the lamb's behavior became increasingly "purposive."

> Six or seven hours after birth the animal had made notable progress.… The sensations of sight began to have a meaning. In less than twenty-four hours, the animal could at the sight of the mother ahead, move in the forward direction at once to come up to her, showing that a particular image had now been associated with a definite movement; the absence of any such association being most manifest in the early movements of life. It could proceed at once to the teat and suck, guided only by its desire and the sight of the object. (Bain, 1855/1977a, p. 406)

Courtesy of the National Library of Medicine

Alexander Bain

Bain (1859/1977b) used hedonism to explain how spontaneous activity is converted into voluntary behavior:

> I cannot descend deeper into the obscurities of the cerebral organization than to state as a fact, that when pain co-exists with an accidental alleviating movement, or when pleasure co-exists with a pleasure-sustaining movement, such movements become subject to the control of the respective feelings which they occur in company with. Throughout all the grades of sentient existence, wherever any vestiges of action for a purpose are to be discerned, this link must be presumed to exist. Turn it over as we may on every side, some such ultimate connexion between the two great primary manifestations of our nature—pleasure and pain, with active instrumentality—must be assumed as the basis of our ability to work out our ends. (p. 349)

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With voluntary behavior, we still have the laws of association at work. Some spontaneous actions become associated with pleasure and therefore repeated; others are associated with pain and therefore reduced in frequency of occurrence. Also, in accordance with the law of frequency, the tendencies to repeat pleasurable responses or to avoid painful ones increase with the frequency of pleasurable or painful consequences. As was the case earlier with Hartley, it is important to note that for Bain, *voluntary* did not mean "free." So-called voluntary behavior was as deterministically controlled as reflexive behavior; it was just controlled differently. Bain said, "The actions of the will, or volition … I consider to be nothing else than action stimulated, and guided, by feeling" (D. N. Robinson, 1977, p. 72). To summarize, Bain explained the development of voluntary behavior as follows:

1. When some need such as hunger or the need to be released from confinement occurs, there is random or spontaneous activity.
2. Some of these random movements will produce or approximate conditions necessary for satisfying the need, and others will not.
3. The activities that bring need satisfaction are remembered.
4. The next time the organism is in a similar situation, it will perform the activities that previously brought about need satisfaction.

Actions that are performed because of their previous effectiveness in a given situation are voluntary rather than reflexive.

Bain essentially described trial-and-error learning, which was to become so important to Thorndike several years later. He also anticipated Skinner's operant conditioning. According to Skinner, operant behavior is simply emitted by an organism; that is, it is spontaneous. Once emitted, however, operant behavior is under the control of its consequences. Responses resulting in pleasurable consequences (reinforcement) tend to be repeated under similar circumstances, and responses resulting in painful consequences (punishment) tend not to be.

With his effort to synthesize what was known about physiology with associationism and his treatment of voluntary behavior, Bain brought psychology to the very brink of becoming an experimental science.

FRENCH SENSATIONALISM

French philosophers also aspired to be Newtonians of the mind, and they had much in common with their British counterparts. The goal for both the French and British was to explain the mind as Newton had explained the physical world—that is, in a way that stressed the mind's mechanical nature, that reduced all mental activity to its basic elements, that used only a few basic principles, and that minimized or eliminated metaphysical speculation. All the French and British philosophers considered in this chapter had these goals in common. We refer to the French philosophers as sensationalists because some of them intentionally stressed the importance of sensations in explaining all conscious experience and because the label provides a convenient way of distinguishing between the British and the French. In general, however, all these philosophers were more similar than they were different, and strongly opposed the rationalism of Descartes, especially his beliefs in innate ideas and in an autonomous mind. All ideas, said both the British empiricists and the French sensationalists, came from experience, and most, if not all, mental activity could be explained by the laws of association acting on those ideas.

The question asked by both the British empiricists and the French sensationalists was, If everything else in the universe can be explained in terms of mechanical laws, why should not humans, too, obey those laws? Although the metaphor of human beings as machines was suggested by the work of Copernicus, Kepler, Galileo, and Newton, it was best articulated by Descartes. Descartes's dualistic conception of humans meant that our bodies act according to mechanical principles (our bodies are machines) but our minds do not. Without the autonomous mind that Descartes had

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postulated, however, humans were equated with mechanical automata or, nonhuman animals; that is, as machines. It was this metaphor of humans as machines that especially appealed to the French sensationalists. In fact, many believed that Descartes himself saw the possibility of viewing humans as machines but that he avoided revealing this belief because of what happened to Galileo and a number of other natural philosophers (scientists) of his time. There was still reason to fear the church in France in the mid-18th century, but the French sensationalists pursued their metaphor of man as a machine with courage and boldness despite intense opposition from the church.

Pierre Gassendi

Pierre Gassendi (1592–1655), a contemporary of both Descartes and Hobbes, lived the quiet life of a studious priest and was respected as a mathematician and philosopher. Both Locke and Newton acknowledged a debt to Gassendi, whose major goal was to denounce Descartes's purely deductive (axiomatic) and dualistic philosophy and replace it with an observational (inductive) science based on physical monism. Gassendi offered several criticisms of Descartes's proposed mind-body dualism, the most telling of which was the observation that the mind, if unextended (immaterial), could have no knowledge of extended (material) things. Only physical things, he said, can influence and be influenced by physical things. He also could not understand why Descartes spent so much time proving that he existed when it was obvious, to Gassendi, that anything that moves exists. Descartes could have said, "I move, therefore I am." In fact, according to Gassendi, such a conclusion would have been a vast improvement over "I think, therefore I am." Continuing his attack on Descartes, Gassendi asked, why could "lower" animals move themselves quite well without the aid of a mind, and yet humans needed one? Why not, Gassendi asked, ascribe the operations attributed to the mind to the functions of the brain (which is physical)? In other words, Gassendi saw no reason for postulating an unextended (immaterial) mind to explain any human activity.

Gassendi concluded that humans are nothing but matter and therefore could be studied and understood just as anything else in the universe could. Gassendi suggested a physical monism not unlike the one that the early Greek atomists, such as Democritus and later the Epicureans, had suggested. In fact, Gassendi was especially fond of Epicurus and the later Epicurean philosophers, and he was responsible for reviving interest in them. For example, he accepted the Epicurean principle of long-term hedonism as the only reasonable guide for human conduct. For these reasons, Gassendi is often considered the founder of modern materialism, but that honor could as easily be given to Gassendi's contemporary Hobbes.

Julien de La Mettrie

Julien de La Mettrie (1709–1751) was born on December 25. His father intended him to become a priest until a local doctor pointed out that a mediocre physician would be better paid than a good priest. Upon receiving his medical degree, La Mettrie soon distinguished himself in the medical community by writing articles on such topics as venereal disease, vertigo, and smallpox. He was widely resented because of professional jealousy, his tendency to satirize the medical profession, and his quick temper. In 1742 he obtained a commission as physician to the regiment of guards serving in the war between France and Austria. During a military campaign, La Mettrie contracted a violent fever; while convalescing, he began to ponder the relationship between the mind and the body.

Upon recovery from his illness, La Mettrie wrote *The Natural History of the Soul* (1745), which stressed that the mind is much more intimately related to the body than Descartes had assumed. If the mind is completely separate from the body and influences the body only when it chooses to do so, how can the effects of such things as wine, coffee, opium, or even a good meal on one's thoughts be explained? In fact, La Mettrie was among the first modern philosophers to suggest that "you are what you eat."

> Raw meat makes animals fierce, and it would have the same effect on man. This is

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> so true that the English who eat meat red and bloody … seem to share more or less in the savagery due to this kind of food, and to other causes which can be rendered ineffective by education only. This savagery creates in the soul, pride, hatred, scorn of other nations, indocility, and other sentiments which degrade the character, just as heavy food makes a dull and heavy mind whose usual traits are laziness and indolence. (La Mettrie, 1748/1912, p. 94)

La Mettrie was not the only French thinker of the era to consider the relationship between food and psychology. For example, Jean-Anthelme Brillat-Savarin's *The Physiology of Taste* (1825) still remains the classic work on the topic, and his own famed axiom "Tell me what you eat, and I will tell you what you are" was a revival of Epicurean philosophy. For Brillat-Savarin, anyone who became drunk, or overindulged, really didn't understand the pleasures of fine dining.

To La Mettrie, it was clear that whatever influences the body influences the so-called thought processes, but La Mettrie went further. He believed that there is nothing in the universe but matter and motion. Sensations and thoughts are also nothing but movements of particles in the brain. Thus, La Mettrie, like Hobbes and Gassendi, was a thoroughgoing materialist.

La Mettrie's book *The Natural History of the Soul* (1745) was harshly criticized by the French clergy. The feelings against him were so intense that he was forced into exile in Holland. While in Holland, he wrote his most famous book, *L'Homme Machine* (*Man a Machine*, 1748). This book so upset the Dutch clergy that La Mettrie was also forced to leave Holland. Fortunately, Frederick the Great offered La Mettrie a pension and refuge in Berlin. There, La Mettrie continued writing on medical topics until his death at the age of just 41.

Man a Machine. La Mettrie was one who believed that Descartes was a mechanist, even as far as humans were concerned, and that his published thoughts on God and the soul were designed to hide his true feelings from the clergy and to save himself from persecution (La Mettrie, 1748/1912, p. 143). In any case, La Mettrie felt that if Descartes had followed his own method, he (Descartes) would have reached the conclusion that humans, like nonhuman animals, were automata. La Mettrie, then, set out to either correct Descartes's misunderstanding of humans or to do what Descartes wanted to do but refrained from doing because of fear of persecution.

La Mettrie concluded *Man a Machine* with the statement, "Let us then conclude boldly that man is a machine, and that in the whole universe there is but a single substance differently modified" (1748/1912, p. 148). The single substance, of course, was matter, and this belief that every existing thing, including humans, consists of matter and nothing else makes La Mettrie a physical monist. For La Mettrie, to believe in the existence of an immaterial soul (mind) was just plain silly. According to La Mettrie, only a philosopher who was not at the same time a physician could postulate the existence of an immaterial soul that is independent from the body. The overwhelming evidence for the dependence of so-called mental events on bodily states available to physicians would (or should) preclude them from embracing dualism.

Human and Nonhuman Animals. La Mettrie (1748/1912) equated intelligence and some personality characteristics with the size and quality of the brain:

> I shall draw the conclusions which follow clearly from … incontestable observations: 1st, that the fiercer animals are, the less brain they have; 2nd, that this organ seems to increase in size in proportion to the gentleness of the animal; 3rd, that nature seems here eternally to impose a singular condition, that the more one gains in intelligence the more one loses in instinct. (pp. 98–99)

If humans can be considered superior to nonhuman animals, it is because of education and the development of language. Because the primate brain is almost as large and as complex as ours, it

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follows that if primates could be taught language, they would resemble humans in almost all respects. The question is, Can primates learn a language?

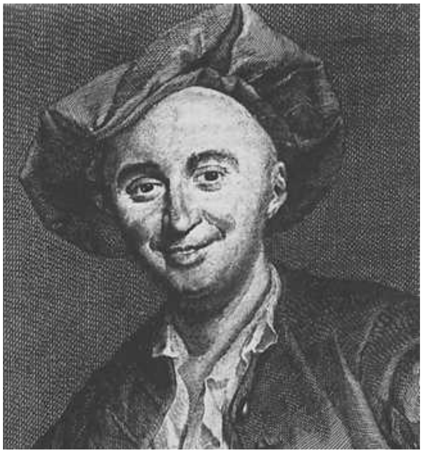
> Among animals, some learn to speak and sing; they remember tunes, and strike the notes as exactly as a musician. Others, for instance the ape, show more intelligence, and yet can not learn music. What is the reason for this, except some defect in the organs of speech? In a word, would it be absolutely impossible to teach the ape a language? I do not think so. (La Mettrie, 1748/1912, p. 100)

With proper training, humans and apes could be made remarkably similar.

> Such is the likeness of the structure and functions of the ape to ours that I have very little doubt that if this animal were properly trained he might at last be taught to pronounce, and consequently to know, a language. Then he would no longer be a wild man, nor a defective man, but he would be a perfect man, a little gentleman, with as much matter or muscle as we have, for thinking and profiting by his education. (La Mettrie, 1748/1912, p. 103)

According to La Mettrie, intelligence was influenced by three factors: brain size, brain complexity, and education. Humans are typically superior in intelligence to other animals because we have bigger, more complex brains and because we are better educated. However, by *education*, La Mettrie did not mean only explicit instruction but also the effects of everyday experience—for example, our interactions with other people.

To say that humans are morally superior to nonhuman animals is to overlook the seamier human activities like cannibalism, infanticide, and wars in which "our compatriots fight, Swiss against Swiss, brother against brother, recognize each other, and yet capture and kill each other without remorse, because a prince pays for the murder" (La Mettrie, 1748/1912, p. 117). Religion, grounded in the belief in a supreme being, certainly has not improved the human condition. It is possible, according to La Mettrie, that atheism could encourage humans to be more humane.



Courtesy of the National Library of Medicine

Julien de La Mettrie

In any case, humans differ from nonhuman animals only in degree, not in type: "Man is not molded from a costlier clay; nature has used but one dough, and has merely varied the leaven" (La Mettrie, 1748/1912, p. 117). And this observation was made over 100 years before Darwin published *The Origin of Species* (1859).

Acceptance of Materialism. According to La Mettrie, belief in the uniqueness of humans (dualism) and in God are not only incorrect but also responsible for widespread misery. Humans would be much better served by accepting their continuity with the animal world. That is, we should accept the fact that, like other animals, humans are machines—complex machines, but machines nonetheless. La Mettrie (1748/1912) described how life would be for the person accepting the materialistic-mechanistic philosophy:

> He who so thinks will be wise, just, tranquil about his fate, and therefore happy. He will await death without either fear or desire, and will cherish life (hardly understanding how disgust can corrupt a heart in this place of many delights); he will be filled with reverence, gratitude, affection, and

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> tenderness for nature, in proportion to his feeling of the benefits he has received from nature; he will be happy, in short, in feeling nature, and in being present at the enchanting spectacle of the universe, and he will surely never destroy nature either in himself or in others. More than that! Full of humanity, this man will love human character even in his enemies. Judge how he will treat others. He will pity the wicked without hating them; in his eyes, they will be but mis-made men. But in pardoning the faults of the structure of mind and body, he will none the less admire the beauties and the virtues of both…. In short, the materialist, convinced, in spite of the protests of his vanity, that he is but a machine or an animal, will not maltreat his kind, for he will know too well the nature of those actions … and following the natural law given to all animals, he will not wish to do to others what he would not wish them to do to him. (pp. 147–148)

La Mettrie dared to discuss openly those ideas that were held privately by many philosophers of the time. In so doing, he offended many powerful individuals. Although it is clear that he influenced many subsequent thinkers, his works were rarely cited or his name even mentioned. The fact that he died of "indigestion" following an overindulgence of pheasant and truffles was seen by many as a most fitting death.

Étienne Bonnot de Condillac

Étienne Bonnot de Condillac (1714–1780) was born into an aristocratic family at Grenoble. He was the contemporary of Hume and Rousseau, and with Voltaire, who was about 20 years older. He was educated at a Jesuit seminary in Paris, but shortly after his ordination as a Roman Catholic priest, he began frequenting the literary and philosophical salons of Paris and gradually lost interest in his religious career. In fact, he became an outspoken critic of religious dogma. Condillac translated Locke's *Essay* into French, and the title of his first book indicates a deep appreciation for Locke's empirical philosophy: *Essay on the Origin of Human Knowledge: A Supplement to Mr. Locke's Essay on the Human Understanding* (1746). Eight years later, in his *Treatise on the Sensations* (1754), Condillac suggested that Locke had unnecessarily attributed too many innate powers to the mind. Condillac was convinced that all powers Locke attributed to the mind could be derived simply from the abilities to sense, to remember, and to experience pleasure and pain.

The Sentient Statue. To make his point, Condillac (1754/1930) asked his readers to imagine a marble statue that can perceive, remember, and feel but has only the sense of smell. The mental life of the statue consists only of odors; beyond that, it cannot have any conception of any other things external to itself, nor can it have sensations of color, sound, or taste. The statue does have the capacity for *attention* because it will attend to whatever odor it experiences. With attention comes *feeling* because attending to a pleasant odor causes enjoyment and attending to an unpleasant odor causes an unpleasant feeling. If the statue had just one continuous pleasant or unpleasant experience, it could not experience desire because it would have nothing with which to compare the experience. If, however, a pleasant sensation ended, remembering it, the statue could desire it to return. Likewise, if an unpleasant experience ended, remembering it, the statue could desire that it not return. For Condillac then, all desire is based on the experiences of pleasure and pain. The statue *loves* pleasant experiences and *hates* unpleasant ones. The statue, given the ability to remember, can not only experience current odors but also remember ones previously experienced. Typically, the former provide a more vivid sensation than the latter.

When the statue smells a rose at one time and a carnation at another, it has the basis for *comparison*. The comparison can be made by currently smelling one and remembering the other or by remembering both odors. With the ability to compare comes the ability to be surprised. *Surprise* is experienced whenever an experience the statue has departs radically from those it is used to: "It cannot fail to notice the change when it passes suddenly from a state to which it is accustomed to a quite different state, of which it has as yet no idea" (Condillac, 1754/1930, p. 10). Also with the ability to compare comes the ability to judge. As with remembering in general, the more comparisons and judgments the statue makes, the easier making them becomes. Sensations are remembered in the order in which they occur; memories then form a chain. This fact allows the statue to recall distant memories by passing from one idea to another until the most distant idea is recalled. According to Condillac, without first recalling intermediary ideas, distant memories would be lost. If the statue remembers sensations in the order they occurred, the process is called *retrieval*. If they are recalled in a different order, it is called *imagination*. *Dreaming* is a form of imagination. Retrieving or imagining that which is hated causes *fear*. Retrieving or imagining what is loved causes *hope*. The statue, having had several sensations, can now notice that they can be grouped in various ways, such as intense, weak, pleasant, and unpleasant. When sensations or memories are grouped in terms of what they have in common, the statue has formed *abstract ideas*, for example, pleasantness. Also by noting that some sensations or memories last longer than others, the statue develops the idea of *duration*.

When our statue has accumulated a vast number of memories, it will tend to dwell more on the pleasant ones than on the unpleasant. In fact, according to Condillac, it is toward the seeking of pleasure or the avoidance of pain that the statue's mental abilities are ultimately aimed: "Thus it is that pleasure and pain will always determine the actions of [the statue's] faculties" (Condillac, 1754/1930, p. 14).

The statue's self, ego, or personality consists of its sensations, its memories, and its other mental abilities. With its memories, it is capable of desiring sensations other than the one it is now having; or by remembering other sensations, it can wish its present sensation to continue or terminate. Experiences (in this case, odors) never experienced cannot become part of the statue's mental life, which consists only of its sensations and its memories of sensations.

Clearly, Condillac was not writing about statues but was discussing how human mental abilities could be derived from sensations, memories, and a few basic feelings. Humans, of course, have more than one sense modality; that fact makes humans much more complicated than the statue, but the principle is the same. There was no need therefore for Locke and others to postulate a number of innate powers of the mind. According to Condillac (1754/1930), the powers of the mind develop as a natural consequence of sensation:

> If we bear in mind that recollecting, comparing, judging, discerning, imagining, wondering, having abstract ideas, and ideas of number and duration, knowing general and particular truths, are only different modes of attention; that having passions, loving, hating, hoping, fearing, wishing, are only different modes of desire; and finally that attention and desire have their origin in feeling alone; we shall conclude that sensation contains within it all the faculties of the soul. (p. 45)

In his analysis of language, Condillac (1746/2001) argued that the meaning of words is determined exclusively by how they are habitually used:

> To understand how mankind came to agreement among themselves about the signification of words they wished to put into use, it is sufficient to observe that they pronounced them in circumstances in which everyone was obliged to refer to the same perceptions. By that means they fixed the meaning with greater exactness in proportion as the circumstances, by frequent repetition, habituated the mind to connect particular ideas to particular signs. The language of action removed the ambiguities and double meanings which in the beginning would occur very often. (p. 156)

There is considerable similarity between Condillac's analysis of language and Wittgenstein's later analysis, which we discuss in Chapter 20.

Claude-Adrien Helvétius and Others. **Claude-Adrien Helvétius (1715–1771)** was born in Paris and educated by Jesuits. He became wealthy as a tax collector, married an attractive countess, and retired to the countryside where he wrote and socialized with some of Europe's finest minds. In 1758 he published *Essays on the Mind*, which was condemned by the Sorbonne and burned. His posthumous *A Treatise on Man: His Intellectual Faculties and His Education* (1772) moved Jeremy Bentham to claim that what Francis Bacon had done for our understanding of the physical world, Helvétius had done for our understanding of the moral world. Also, James Mill claimed to have used Helvétius's philosophy as a guide in the education of his son, John Stuart.

Helvétius did not contradict any of the major tenets of British empiricism or French sensationalism, nor did he add any new ones. Rather, he explored in depth the implication of the contention that the contents of the mind come only from experience. In other words, control experiences and you control the contents of the mind. The implications of this belief for education and even the structure of society were clear, and in the hands of Helvétius, empiricism became radical *environmentalism*. All manner of social skills, moral behavior, and even genius could be taught through the control of experiences (education). Russell (1945) said of Helvétius, "His doctrine is optimistic, since only a perfect education is needed to make men perfect. There is a suggestion that it would be easy to find a perfect education if the priests were got out of the way" (p. 722).

Because Helvétius too was a hedonist, education in general terms could be viewed as the manipulation of pleasurable and painful experiences. Today we might state this as reinforcing desirable thoughts and behavior and either ignoring or punishing undesirable thoughts and behavior. In this sense, Helvétius's position has much in common with that of the modern behaviorists.

Beyond Helvétius there were other French sensationalists that deserve at least a mention. For example, Francois-Pierre Maine de Biran's (1766–1824) initial writings expanded on Locke's philosophy and added a careful consideration of habit formation (learning). Pierre Jean Georges Cabinas (1757–1808) was a physician during the French Revolution. Interested in the relationship between mind and body, he studied those executed by the guillotine to show that no trace of consciousness endured beheading. For Cabinas the brain was an organ analogous to the stomach; its role was to digest sensory information—mental activities were then much like digestive activities—the result of organ functioning.

POSITIVISM

The British empiricists and the French sensationalists had in common the belief that all knowledge comes from experience; that is, that there are no innate ideas. All knowledge, they said, even moral knowledge, was derived from experience. If the denial of innate moral principles did not place the empiricists and the sensationalists in direct opposition to religion, it certainly placed them in direct opposition to religious dogma.

As the successes of the physical and mental sciences spread throughout Europe, and as religious doctrine became increasingly suspect, a new belief emerged—the belief that science, not religion, was best suited to solve all human problems. Such a belief is called **scientism**. To those embracing scientism, scientific knowledge is the only valid knowledge; therefore, it provides the only information one can believe. For these individuals, science itself takes on some of the characteristics of a religion. One such individual was Auguste Comte.

Auguste Comte

Auguste Comte (1798–1857), born in the French city of Montpellier, grew up in the period of great political turmoil that followed the French Revolution of 1789–1799. In school, Comte was an excellent student, but a troublemaker. In 1817, Comte met the social philosopher Henri de Saint-Simon (1760–1825), who converted Comte from an ardent advocate of liberty and equality to a

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supporter of a more elitist view of society. The two men collaborated on a number of essays, but after a bitter argument, they parted company in 1824. In 1826, Comte began giving lectures in his home on his positivist philosophy—that is, the attempt to use the methods of the physical sciences to create a science of history and human social behavior. His lectures were attended by a number of illustrious individuals, but after only three lectures, Comte suffered a serious mental collapse. Despite being treated in a hospital for a while, he fell into deep depression and even attempted suicide. He was unable to resume his lectures until 1829. Financial problems, lack of professional recognition, and marital difficulties combined to drive Comte back into isolation.

Between 1830 and 1842, his time was spent mainly on writing his six-volume work, *Cours de Philosophe Positive* (*The Course of Positive Philosophy*, 1830–1842). Comte's *Cours* was translated into English by the philosopher-feminist Harriet Martineau (1802–1876) in 1853. As a result of the *Cours*, Comte began to attract a few admirers, among them John Stuart Mill. However, soon after the publication of the *Cours*, Comte's wife left him. In 1844 he met and fell in love with Clotilde de Vaux, and although she died of tuberculosis soon after they met, he vowed to dedicate the rest of his life to her memory. Soon afterward he began writing *Système de Politique Positive (System of Positive Politics)*, in which Comte introduced his religion of humanity (discussed later). The *Système* cost Comte most of his influential followers, including Mill. Undaunted, Comte continued to concentrate on his new religion, of which he installed himself as high priest. Comte spent his later years attempting to gain converts to his religion. He even tried to recruit some of the most powerful individuals in Europe, including Czar Nicholas I and the head of the Jesuits.

Comte's Positivism. According to Comte, the only thing we can be sure of is that which is publicly observable—that is, sense experiences that can be shared with other individuals. The data of science are publicly observable and therefore can be trusted. For example, scientific laws are statements about how empirical events vary together, and once determined, they can be experienced by any interested party. Comte's insistence on equating knowledge with empirical observations was called **positivism**. As an aside, positivism does not have as its opposite "negativism." It derives from a French term meaning to be put into place, or to be placed in the mind by experience, akin to the English verb *posit.*

Comte was a social reformer and was interested in science only as a means of improving society. Knowledge, whether scientific or not, was not important unless it had some practical value. Comte wrote, "I have a supreme aversion to scientific labors whose utility, direct or remote, I do not see" (Esper, 1964, p. 213). According to Comte, science should seek to discover the lawful relationships among physical phenomena. Once such laws are known, they can be used to predict and control events and thus improve life. One of Comte's favorite slogans was "Know in order to predict" (Esper, 1964, p. 213). Comte's approach to science was very much like the one suggested earlier by Francis Bacon. According to both Comte and Bacon, science should be practical and nonspeculative. Comte told his readers that there are two types of statements: "One refers to the objects of sense, and it is a scientific statement. The other is nonsense" (D. N. Robinson, 1986, p. 333).

It should be pointed out that positivistic thinking had been around in one form or another since at least the time of the early Greeks:

> The history of positivism might be said to extend from ancient times to the present. In ancient Greece it was represented by such thinkers as Epicurus, who sought to free men from theology by offering them an explanation of the universe in terms of natural law.… The cumulative successes of the scientific method in the seventeenth and eighteenth centuries increasingly favored the acceptance of the positivistic attitude among intellectuals. In England, the empirical philosophy, beginning with Francis Bacon and culminating in Hume and John Stuart Mill,

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> became an essential part of the positivist tradition. (Esper, 1964, pp. 212–213)

In fact, because all the British empiricists and French sensationalists stressed the importance of sensory experience and avoided metaphysical and theological speculation, they all could be said to have had at least positivistic leanings.

The Law of Three Stages. According to Comte, societies pass through stages that are defined in terms of the way its members explain natural events. The first stage, and the most primitive, is *theological*, and explanations are based on superstition and mysticism. In the second stage, which is *metaphysical*, explanations are based on unseen essences, principles, causes, or laws. During the third and highest stage of development, the *scientific* description is emphasized over explanation, and the prediction and control of natural phenomena becomes all important. In other words, during the scientific stage, positivism is accepted. Comte used the term sociology to describe the study of how different societies compared in terms of the three stages of development.

Comte described the events that characterize the transition from one stage to another in much the same way that Kuhn (1996) described paradigmatic shifts in science. According to Comte, the beliefs characteristic of a particular stage become a way of life for the people within a society. It is only a few of the society's wisest individuals who glimpse the next stage and begin to pave the way for it. There follows a critical period during which a society is in transition between one stage and another. The beliefs characterizing the new stage then become a way of life until the process is repeated. As with a paradigmatic shift in science, there are always remnants of earlier stages in the newly established one.

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Auguste Comte

As evidence for his law of three stages, Comte observed that individuals also pass through the same stages:

> The progress of the individual mind is not only an illustration, but an indirect evidence of that of the general mind. The point of departure of the individual and of the race being the same, the phases of the mind of a man correspond to the epochs of the mind of the race. Now, each of us is aware, if he looks back upon his own history, that he was a theologian in his childhood, a metaphysician in his youth, and a natural philosopher in his manhood. All men who are up to their age can verify this for themselves. (Martineau, 1853/1893, p. 3)

Religion and the Sciences. By the late 1840s, Comte was discussing positivism as if it were religion. To him, science was all that one needed to believe in and all that one should believe in. He described a utopian society based on scientific principles and beliefs and whose organization was remarkably similar to the Roman Catholic Church. However, humanity replaced God, and scientists and philosophers replaced priests. Disciples of the new religion would be drawn from the working classes and especially from among women:

> The triumph of positivism awaited the unification of three classes: The philosophers, the proletariat, and women. The first would establish the necessary intellectual and scientific principles and methods of inquiry; the second would guarantee that

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> essential connection between reality and utility; the third would impact to the entire program the abiding selflessness and moral resolution so natural to the female constitution. (D. N. Robinson, 1982, pp. 41–42)

Comte's religion of humanity was one of the reasons that John Stuart Mill became disenchanted with him. Comte's utopia emphasized the happiness of the group and minimized individual happiness. In Mill's version of utilitarianism, the exact opposite is true.

Comte arranged the sciences in a hierarchy from the first developed and most basic to the last developed and most comprehensive as follows: mathematics, astronomy, physics, chemistry, physiology and biology, and sociology. It is of special interest to note that psychology did not appear on Comte's list of sciences. If what is meant by *psychology* is "the introspective analysis of the mind," then Comte believed that psychology was metaphysical nonsense. Science, for Comte, dealt with what could be publicly observed, and that excluded introspective data. He had harsh words to say about introspection:

> In order to observe, your intellect must pause from activity; yet it is this very activity you want to observe. If you cannot effect the pause you cannot observe; if you do effect it, there is nothing to observe. The results of such a method are in proportion to its absurdity. After two thousand years of psychological pursuit, no one proposition is established to the satisfaction of its followers. They are divided, to this day, into a multitude of schools, still disputing about the very elements of their doctrine. This internal observation gives birth to almost as many theories as there are observers. We ask in vain for any one discovery, great or small, which has been made under this method. (Martineau, 1853/1893, p. 10)

For Comte, two methods, however, were available by which the individual could be studied objectively. One way was to embrace phrenology, which was an effort to relate mental events to brain anatomy and processes (we will discuss phrenology in Chapter 8). Phrenological analysis essentially reduced psychology to physiology. The second way was to study the mind by its products—that is, to study the mind by studying overt behavior, especially social behavior. The study of human social behavior is a second sense in which Comte used the term *sociology*. So, the first objective way of studying humans reduced psychology to physiology, and the second reduced it to sociology. In the latter case, there was no studying "me," only "us."

A Second Type of Positivism

Comte insisted that we accept only that of which we can be certain, and for him, that was publicly observable data. For Comte, introspection was out because it examined only private experiences. Another brand of positivism emerged later, however, under the leadership of the physicist **Ernst Mach (1838–1916)**. Mach, like Comte, insisted that science concentrate only on what could be known with certainty. Neither Comte nor Mach allowed metaphysical speculation in their views of science. The two men differed radically, however, in what they thought scientists could be certain

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Ernst Mach

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about. For Comte, it was physical events that could be experienced by any interested observer. Mach, however, agreed with the contention of Berkeley and Hume—that we can never experience the physical world directly. We experience only sensations or mental phenomena.

For Mach, the job of the scientist was to note which sensations typically cluster together and to describe in precise mathematical terms the relationships among them. According to Mach, "There can be no a priori knowledge of the world, only experiences that, when systematically organized, can lay claim to the status of scientific knowledge" (D. N. Robinson, 2000, p. 1020). In agreement with Hume, Mach concluded that so-called cause-and-effect relationships are nothing more than functional relationships among mental phenomena. Although for Mach the ultimate subject matter of *any* science was necessarily cognitive, this fact need not prevent scientists from doing their work objectively and without engaging in metaphysical speculation. In his influential book *The Science of Mechanics* (1883/1960), Mach insisted that scientific concepts be defined in terms of the procedures used to measure them rather than in terms of their "ultimate reality" or "essence." Thus, both Comte and Mach were positivistic, but what they were positive about differed.

Mach went beyond Comte's assertion of the primacy of science, and wrote about the methods that should govern the proper conduct of science. In doing so, Mach anticipated Bridgman's concept of the operational definition (see Chapter 13), and Einstein often referred to Mach as an important influence on his life and work. Following Mach, positivism was revised through the years as the prevailing philosophy of science, and was eventually transformed into *logical positivism*. It was through logical positivism that positivistic philosophy had its greatest impact on psychology. We will discuss logical positivism and its impact on psychology in Chapter 13.

SUMMARY

A group of British philosophers opposed Descartes's notion of innate ideas, saying that all ideas were derived from experience. Those who claimed that experience was the basis of all knowledge were called empiricists. Hobbes insisted that all human activity was ultimately reducible to physical and mechanistic principles; thus, he was a materialist and a mechanist as well as an empiricist. He believed that the function of a society was to satisfy the needs of individuals and to prevent individuals from fighting among themselves. He also believed that all human behavior was ultimately motivated by the seeking of pleasure and the avoidance of pain.

Locke was an empiricist who distinguished between the primary qualities of objects, which caused ideas that actually resembled attributes of those objects, and secondary qualities, which caused psychological experiences that had no counterpart in the physical world. Locke believed that all ideas are derived from sensory experience but that existing ideas could be rearranged by the mind into numerous configurations. Like most of the other empiricists, Locke believed that all human emotions are derived from the two basic emotions of pleasure and pain. Locke's views on education were compatible with his empirical philosophy and were highly influential.

Berkeley denied the existence of a material world, saying instead that all that exists are perceptions. Although an external world exists because God perceives it, we can know only our own perceptions of that world. We can assume that our perceptions of the world accurately reflect external reality, however, because God would not allow our senses to deceive us.

Hume agreed with Berkeley that the only thing we experience directly is our own subjective experience but disagreed with Berkeley's faith that our perceptions accurately reflect the physical world. For Hume, we can never know anything about the physical world because all we ever experience is thought and habits of thought. Hume made the laws of association the cornerstone of his philosophy. He postulated three such laws: the law of contiguity, which states that events experienced together are remembered together; the law of resemblance, which states that remembering one event tends to elicit memories of similar events; and the law of cause and effect, which states that we tend to believe that the circumstances that consistently precede an event cause that event. According to Hume, it is the passions (emotions) that govern behavior, and because people differ in their patterns of emotions, individual behavior differs.

Hartley attempted to couple empiricism and associationism with a rudimentary conception of physiology. Hartley was among the first to show how the laws of association might be used to explain learned behavior. According to his analysis, involuntary (reflexive) behavior gradually becomes associated with environmental stimuli, such as when a child's grasping becomes associated with a favorite toy. In accordance with the tradition of empiricism, Hartley believed pleasure and pain govern behavior, and it was his disciple Priestley who saw the implications of Hartley's hedonism for educational practices.

James Mill pushed empiricism and associationism to their logical conclusion by saying that all ideas could be explained in terms of experience and associative principles. He said that even the most complex ideas could be reduced to simpler ones. John Stuart Mill disagreed with his father's contention that simple ideas remained intact as they combined into more complex ones. He maintained that at least some simple ideas underwent a fusion and that the complex idea they produce could be quite different from the simpler ideas that make it up. J. S. Mill's idea of fusion was called mental chemistry. J. S. Mill believed that a mental science could develop that would eventually be on par with the physical sciences. According to J. S. Mill, the primary laws governing behavior are already known; what is needed to make mental science an exact science is an understanding of the secondary laws that determine how individuals act under specific circumstances. He accepted Bentham's utilitarianism—the ethical position that the best action is the one that produces the greatest good.

Alexander Bain was the first to write an entire book on the relationship between the mind and the body, to use known neurophysiological facts in explaining psychological phenomena, and to found a psychology journal. He explained voluntary behavior in terms of spontaneous behavior and hedonism, and he added the laws of compound association and constructive association to the list of traditional laws of association.

Like the British empiricists, the French sensationalists believed that all ideas are derived from experience. The sensationalists were either materialists (like Hobbes) denying the existence of mental events, or they were mechanists believing that all mental events could be explained in terms of simple sensations and the laws of association. Gassendi believed that Descartes's division of a person into a material body and a nonmaterial mind was silly. All so-called mental events, he said, result from the brain, not the mind. Like Hobbes, Gassendi concluded that all that exists is matter, and this includes all aspects of humans. In his book *Man a Machine*, La Mettrie proposed that humans and nonhuman animals differ only in degree of complexity and that both could be understood as machines. If we viewed ourselves as part of nature, said La Mettrie, we would be less inclined to abuse the environment, nonhuman animals, and our fellow humans. Condillac, using the example of a sentient statue with only the sense of smell, the ability to remember, and the ability to feel pleasure and pain, proposed to show that all human cognitive and emotional experience could be explained; thus, there was no need to postulate an autonomous mind. Helvétius applied empiricism and sensationalism to the realm of education, saying that by controlling experience, you control the content of the mind.

With the widespread success of science, some people believed that science could solve all problems and answer all questions. Such a belief was called scientism. Accepting scientism, Comte created a position called positivism, according to which only scientific information should be considered valid. Anything not publicly observable was suspect and was rejected as a proper object of study. Comte suggested that cultures progressed through three stages in their attempt to explain phenomena: the theological, the metaphysical, and the scientific. Comte did not believe psychology could become a science because studying the mind required using the unreliable method of introspection. Years following Comte, Mach proposed another type of positivism based on the phenomenological experiences of scientists. Like Comte, Mach wanted to rid science of metaphysical speculation.

DISCUSSION QUESTIONS

1. Define *empiricism*. What was it in other philosophies that the empiricists opposed most?
2. Discuss why Hobbes can be referred to as an empiricist, a mechanist, and a materialist.
3. What was Hobbes's explanation of human motivation?
4. According to Locke, what was the difference between primary and secondary qualities? How did the paradox of the basins demonstrate this difference?
5. Explain Berkeley's statement "To be is to be perceived." Did Berkeley deny the existence of external reality?
6. Summarize Berkeley's explanation of distance perception.
7. Discuss the associative principles of contiguity, resemblance, and cause and effect as Hume used them.
8. Summarize Hume's analysis of causation.
9. What, for Hume, were the ultimate determinants of behavior? Explain.
10. What was Hartley's philosophical goal? In what way might he be considered the first modern psychologist?
11. Summarize Hartley's explanation of association.
12. How, according to Hartley, was involuntary behavior transformed into voluntary behavior?
13. What part did the emotions play in Hartley's philosophy?
14. Summarize James Mill's version of associationism.
15. Compare the "mental physics" of James Mill with the "mental chemistry" of his son John Stuart Mill.
16. Why did J. S. Mill believe a science of human nature was possible? What would characterize such a science in its early stages of development? In its later stages? Include in your answer a discussion of primary and secondary laws.
17. What was Bain's philosophical goal? In what way might he be considered the first modern psychologist?
18. Summarize Bain's contributions to psychology. Include in your answer the new laws of association that he added and his explanation of how spontaneous activity is transformed into voluntary behavior.
19. What were the major features of French sensationalism?
20. In what ways was Gassendi's philosophy similar to Hobbes's?
21. Why did La Mettrie believe that it was inappropriate to separate the mind and body?
22. What did La Mettrie believe humans and nonhuman animals have in common?

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23. How did Condillac use the analogy of a sentient statue to explain the origin of human mental processes? Give the examples of how attention, feeling, comparison, and surprise develop.
24. How did Helvétius apply empiricism and sensationalism to education?
25. What did Comte mean by *positivism*?
26. Describe the stages that Comte believed cultures (and individuals) went through in the way they attempted to explain phenomena.
27. Did Comte believe psychology could be a science? Why or why not?
28. Compare Mach's version of positivism with Comte's.

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GLOSSARY

Associationism The belief that the laws of association provide the fundamental principles by which all mental phenomena can be explained.

Bain, Alexander (1818–1903) The first to attempt to relate known physiological facts to psychological phenomena. He also wrote the first psychology texts, and he founded psychology's first journal (1876). Bain explained voluntary behavior in much the same way that modern learning theorists later explained trial-and-error behavior. Finally, Bain added the law of compound association and the law of constructive association to the older, traditional laws of association.

Bentham, Jeremy (1748–1832) Said that the seeking of pleasure and the avoidance of pain governed most human behavior. Bentham also said that the best society was one that did the greatest good for the greatest number of people.

Berkeley, George (1685–1753) Said that the only thing we experience directly is our own perceptions, or secondary qualities. Berkeley offered an empirical explanation of the perception of distance, saying that we learn to associate the sensations caused by the convergence and divergence of the eyes with different distances. Berkeley denied materialism, saying instead that reality exists because God perceives it. We can trust our senses to reflect God's perceptions because God would not create a sensory system that would deceive us.

Complex ideas Configurations of simple ideas.

Comte, Auguste (1798–1857) The founder of positivism and coiner of the term *sociology*. He felt that cultures passed through three stages in the way they explained phenomena: the theological, the metaphysical, and the scientific.

Condillac, Étienne Bonnot de (1714–1780) Maintained that all human mental attributes could be explained using only the concept of sensation and that it was therefore unnecessary to postulate an autonomous mind.

Empiricism The belief that all knowledge is derived from experience, especially sensory experience.

Gassendi, Pierre (1592–1655) Saw humans as nothing but complex, physical machines, and he saw no need to assume a nonphysical mind. Gassendi had much in common with Hobbes.

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Hartley, David (1705–1757) Combined empiricism and associationism with rudimentary physiological notions.

Helvétius, Claude-Adrien (1715–1771) Elaborated the implications of empiricism and sensationalism for education. That is, a person's intellectual development can be determined by controlling his or her experiences.

Hobbes, Thomas (1588–1679) Believed that the primary motive in human behavior is the seeking of pleasure and the avoidance of pain. For Hobbes, the function of government is to satisfy as many human needs as possible and to prevent humans from fighting with each other. Hobbes believed that all human activity, including mental activity, could be reduced to atoms in motion; therefore, he was a materialist.

Hume, David (1711–1776) Agreed with Berkeley that we could experience only our own subjective reality but disagreed with Berkeley's contention that we could assume that our perceptions accurately reflect the physical world because God would not deceive us. For Hume, we can be sure of nothing. Even the notion of cause and effect, which is so important to Newtonian physics, is nothing more than a habit of thought. Hume distinguished between impressions, which are vivid, and ideas, which are faint copies of impressions.

Idea A mental event that lingers after impressions or sensations have ceased.

Imagination According to Hume, the power of the mind to arrange and rearrange ideas into countless configurations.

Impressions According to Hume, the relatively strong mental experiences caused by sensory stimulation. For Hume, impression is essentially the same thing as what others called sensation.

La Mettrie, Julien de (1709–1751) Believed humans were machines that differed from other animals only in complexity. La Mettrie believed that so-called mental experiences are nothing but movements of particles in the brain. He also believed that accepting materialism would result in a better, more humane world.

Law of cause and effect According to Hume, if in our experience one event always precedes the occurrence of another event, we tend to believe that the former event is the cause of the latter.

Law of compound association According to Bain, contiguous or similar events form compound ideas and are remembered together. If one or a few elements of the compound idea are experienced, they may elicit the memory of the entire compound.

Law of constructive association According to Bain, the mind can rearrange the memories of various experiences so that the creative associations formed are different from the experiences that gave rise to the associations.

Law of contiguity The tendency for events that are experienced together to be remembered together.

Law of resemblance According to Hume, the tendency for our thoughts to run from one event to similar events, the same as what others call the law, or principle, of similarity.

Locke, John (1632–1704) An empiricist who denied the existence of innate ideas but who assumed many nativistically determined powers of the mind. Locke distinguished between primary qualities, which cause sensations that correspond to actual attributes of physical bodies, and secondary qualities, which cause sensations that have no counterparts in the physical world. The types of ideas postulated by Locke included those caused by sensory stimulation, those caused by reflection, simple ideas, and complex ideas, which were composites of simple ideas.

Mach, Ernst (1838–1916) Proposed a brand of positivism based on the phenomenological experiences of scientists. Because scientists, or anyone else, never experience the physical world directly, the scientist's job is to precisely describe the relationships among mental phenomena, and to do so without the aid of metaphysical speculation.

Mental chemistry The process by which individual sensations can combine to form a new sensation that is different from any of the individual sensations that constitute it.

Mill, James (1773–1836) Maintained that all mental events consisted of sensations and ideas (copies of sensations) held together by association. No matter how complex an idea was, Mill felt that it could be reduced to simple ideas.

Mill, John Stuart (1806–1873) Disagreed with his father James that all complex ideas could be reduced to simple ideas. J. S. Mill proposed a process of mental chemistry according to which complex ideas could be distinctly different from the simple ideas (elements) that constituted them. J. S. Mill believed strongly that a science of human nature could be and should be developed.

Paradox of the basins Locke's observation that warm water will feel either hot or cold depending on whether a hand is first placed in hot water or cold water. Because water cannot be hot and cold at the same time, temperature must be a secondary, not a primary, quality.

Positivism The contention that science should study only that which can be directly experienced. For Comte, that was publicly observed events or overt behavior. For Mach, it was the sensations of the scientist.

Primary laws According to J. S. Mill, the general laws that determine the overall behavior of events within a system.

Quality According to Locke, that aspect of a physical object that has the power to produce an idea. (*See also* **Primary qualities** and **Secondary qualities.**)

Reflection According to Locke, the ability to use the powers of the mind to creatively rearrange ideas derived from sensory experience.

Scientism The almost religious belief that science can answer all questions and solve all problems.

Secondary laws According to J. S. Mill, the laws that interact with primary laws and determine the nature of individual events under specific circumstances.

Sensation The rudimentary mental experience that results from the stimulation of one or more sense receptors.

Simple ideas The mental remnants of sensations.

Spontaneous activity According to Bain, behavior that is simply emitted by an organism rather than being elicited by external stimulation.

Utilitarianism The belief that the best society or government is one that provides the greatest good (happiness) for the greatest number of individuals. Jeremy Bentham, James Mill, and John Stuart Mill were all utilitarians.

Vibratiuncles According to Hartley, the vibrations that linger in the brain after the initial vibrations caused by external stimulation cease.

Voluntary behavior According to Bain, under some circumstances, an organism's spontaneous activity leads to pleasurable consequences. After several such occurrences, the organism will come to voluntarily engage in the behavior that was originally spontaneous.

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6

Rationalism

In Chapter 5, we defined *empiricism* as the belief that experience is the basis of all knowledge. The empiricists tended to describe a **passive mind**, that is, a mind that acts on sensations and ideas in an automatic, mechanical way. The rationalists tended to postulate a much more **active mind**, a mind that interacts with information from the senses and gives it meaning that it otherwise would not have.

For the rationalist, the mind added something to sensory data rather than simply passively organizing and storing it in memory. Typically, the rationalist assumed innate mental structures, principles, operations, or abilities that are used in analyzing the content of thought. Furthermore, the rationalist tended to believe that there are truths about ourselves and about the world that cannot be ascertained simply by merely experiencing the content of our minds; these truths must be arrived at by such processes as logical deduction, analysis, and argument. In other words, the information provided by the senses must be digested by a rational system before such truths could be discovered. For the rationalist, it was important not only to understand the contents of the mind, part of which may indeed come from experience, but also to know how the mechanisms, abilities, or faculties of the mind process that content.

For the empiricist, experience, memory, association, and hedonism determine not only how a person thinks and acts but also his or her morality. For the rationalist, however, there are rational reasons that some acts or thoughts are more desirable than others are. For example, there are moral principles, and if they are properly understood and acted on, they result in moral behavior. Imagine you are riding along on a lengthy road trip with a friend. If you ask the driver why she is always driving within the posted speed limit, she might say, "I didn't want to get a speeding ticket" or "I always obey the law." Can we say that the speed limit *caused* the driver to drive at

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a certain speed? No, not in the sense that she was compelled to do so by the laws of nature. But yes, in the sense that she knew the consequences of not doing so and decided to avoid them.

Whereas the empiricist stresses *induction* (the acquisition of knowledge through sensory experience and the generalizations from it), the rationalist stresses *deduction*. Given certain sensory data and certain rules of thought, certain conclusions must follow. It should be no surprise that mathematics (especially geometry) and logic have been more important to the rationalists than to the empiricists.

Do not be left with the impression that a clear distinction always exists between empiricism and **rationalism**; it does not. Some empiricists postulated a mind that was anything but passive, and most, if not all, rationalists accepted the importance of sensory information in the quest for knowledge and truth. In most cases, the difference between an empiricist and a rationalist was a matter of emphasis. The empiricist (and the sensationalist) emphasized the importance of sensory information and postulated a relatively passive mind that tended to function according to mechanistic laws—what we might call a "bottom-up" approach. The rationalist emphasized the importance of innate structures, principles, or concepts and postulated an active mind that transforms, in important ways, the data provided by the senses. As such, preexisting knowledge influences experience in a "top-down" way.

The first of several rationalists that we will consider is Baruch Spinoza.

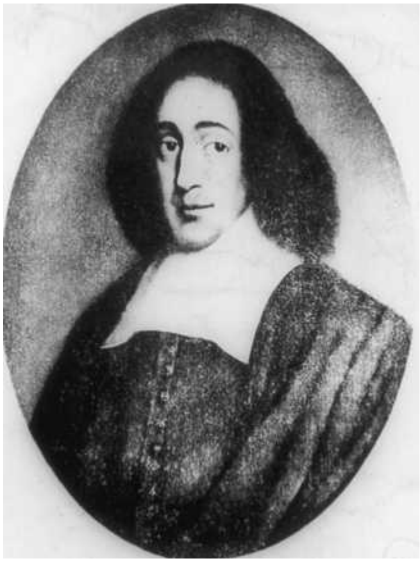
BARUCH SPINOZA

Baruch (sometimes *Benedict*) **Spinoza (1632–1677)** was born of Portuguese Jewish parents in Amsterdam. When Spinoza was growing up, Holland was a center of intellectual freedom and attracted such individuals as Descartes and Locke. Spinoza was initially impressed by Descartes's philosophy, and one of Spinoza's first books was an account of Cartesian philosophy. Eventually, however, Spinoza rejected Descartes's contention that God, matter, and mind were all separate entities. Instead, Spinoza proposed that all three were simply aspects of the same substance. In other words, for Spinoza, God, nature, and the mind were inseparable. His proposal ran contrary to the anthropomorphic God image of the Jewish and Christian religions, and he was condemned by both. When he was 27 years old, the rabbis accused Spinoza of heresy and urged him in vain to repent. On July 27, 1656, he was excommunicated and the following edict was issued:

> We ordain that no one may communicate with him verbally or in writing, nor show him any favour, nor stay under the same roof with him, nor be within four cubits of him, nor read anything composed or written by him. (Scruton, 2002, p. 10)

The civil authorities, acting on the advice of the rabbis and the Calvinist clergy, banished Spinoza from Amsterdam. After a short time, however, he returned to the city and supported himself by giving private lessons in Cartesian philosophy and grinding and polishing lenses. He consistently refused to accept gifts and money offered to him by his admirers, one of whom was the great philosopher Leibniz (discussed later). He even rejected the chair of philosophy at the University of Heidelberg because accepting the position would preclude his criticism of Christianity (Alexander & Selesnick, 1966).

Spinoza carried on extensive correspondence with many major thinkers of his day, but only one of his books was published during his lifetime (and it was published anonymously). His major work, *Ethics: Demonstrated in Geometrical Order*, was published posthumously in 1677. A number of his other works were collected by his friends and were published shortly after his death. Spinoza contracted a lung disease, perhaps from his lens-grinding activities, and died on February 21 at the age of 44. As the full title of Spinoza's *Ethics* implies, he was deeply impressed with the deductive method of geometry.



Courtesy of the National Library of Medicine

Baruch Spinoza

In his faith that the methods of geometry could be used to discover truth in nonmathematical areas, Spinoza agreed with Descartes and Hobbes. In his *Ethics*, Spinoza presented a number of "self-evident" axioms from which he proposed to deduce other truths about the nature of reality. His ultimate goal was to discover a way of life that was both ethically correct and personally satisfying.

For Spinoza, to understand the laws of nature was to understand God. Spinoza embraced **pantheism**, or the belief that God is present everywhere and in everything. By equating God and nature, Spinoza eliminated the distinction between the sacred and the secular. He denied demons, revelation, and an anthropomorphic God. Such beliefs not only caused his works to be condemned by essentially all religious leaders even in his liberal homeland of Holland, but also laid the foundation for his understanding of mind and body.

Mind–Body Relationship

Dualists, like Descartes, who maintained that there was a material body and a nonmaterial mind, were obliged to explain how the two were related. Conversely, materialists were obliged to explain the origin of those things that we experience as *mental* events (mind). Spinoza escaped the difficulties experienced by both dualists and materialists by assuming that the mind and body were two aspects of the same thing—the living human being. For Spinoza, the mind and the body were like two sides of a coin. Even though the two sides are different, they are two aspects of the same coin. Thus, the mind and body are inseparable; anything happening to the body is experienced as emotions and thoughts; and emotions and thoughts influence the body. In this way, Spinoza combined physiology and philosophy into one unified system. Spinoza's position on the mind–body relationship has been called psychophysical double aspectism, double-aspect monism, or simply **double aspectism** (see Chapter 1, Figure 1.1).

Spinoza's position on the mind–body relationship followed necessarily from his concept of God. God's own nature is characterized by both extension (matter) and thought (which is nonextended), and because God *is* nature, all of nature is characterized by both extension and thought. Because God is a thinking, material substance, everything in nature is a thinking, material substance. Humans, according to Spinoza, being part of nature, are thinking, material substances. Mental activity was not confined to humans nor even to the organic world. Everything, organic and inorganic, shared in the one substance that is God, and therefore everything had both mental and physical attributes. For Spinoza, the unity of the mind and body was but one manifestation of an all-encompassing unity of matter and thought. Spinoza's pantheism necessitated a *panpsychism*; that is, because God is everywhere, so is mind.

Denial of Free Will

God is nature, and nature is lawful. Humans are part of nature, and therefore human thoughts and behavior are lawful; that is, they are determined. Although humans may believe that they are free to act and think any way they choose, in reality they cannot. According to Spinoza, free will is a fiction:

> In the mind there is no absolute or free will; but the mind is determined to wish this or that by a cause, which has also been

> determined by another cause, and this last
> by another cause, and so on to infinity.
> (Elwes, 1955, p. 119)

Elsewhere, Spinoza said that it is human ignorance of the causes of events that makes us believe that we possess free will: "Men think themselves free inasmuch as they are conscious of their volitions and desires, and never even dream, in their ignorance, of the causes which have disposed them so to wish and desire" (Elwes, 1955, p. 75).

Our "freedom," then, consists in knowing that everything that is must necessarily be and everything that happens must necessarily happen. Nothing can be different because everything results from God. To understand the necessity of nature results in the highest pleasure because one views oneself as part of the eternal. According to Spinoza, it makes no sense to view God as the cause of all things *and*, at the same time, to believe that humans possess a free will.

Although Spinoza's God did not judge humans, Spinoza still considered it essential that we understand God. That is, Spinoza insisted that the best life was one lived with a knowledge of the causes of things. The closest we can get to freedom is understanding what causes our behavior and thoughts: "The free man is one conscious of the necessities that compel him" (Scruton, 2002, p. 91). The murderer is no more responsible for his or her behavior than is a river that floods a village. If the causes of both were understood, however, the aversive events could be controlled or prevented.

Motivation and Emotion

Spinoza was a hedonist because he claimed that what are commonly referred to as good and evil are "nothing else but the emotions of pleasure and pain" (Elwes, 1955, p. 195). By *pleasure*, however, Spinoza meant "the entertaining of clear ideas," or having a clear purpose. A *clear idea* is one that is conducive to the mind's survival because it reflects an understanding of causal necessity. That is, it reflects a knowledge of why things are as they are. When the mind entertains unclear ideas or is overwhelmed by passion, it feels weak and vulnerable, and experiences pain and confusion because it lacks clarity.

The highest pleasure, then, comes from understanding God, because to do so is to understand the laws of nature. If the mind dwells only on momentary perceptions or passions, it is being passive and not acting in a way conducive to survival. The mind realizes that most sense perceptions produce ideas that are unclear and therefore inadequate because they lack the distinctiveness and self-evident character of true (clear) ideas. Because unclear ideas do not bring pleasure, the mind seeks to replace them with clear, adequate ideas through the process of reasoned reflection. In other words, clear ideas must be sought by an active mind; they do not appear automatically from sensory experience. We know intuitively that the body must be maintained because of its inseparable connection to the mind. Thus, the body, just like the mind, will attempt to avoid things harmful to itself and will seek those things that it needs to survive.

According to Spinoza then, the good life consists of

> that which is most "useful"—favourable—
> to our nature; the bad life that which is
> most opposed to it. Vice and wickedness
> are to be avoided, not because they are
> punished by God (who engages in no such
> absurd endeavors) but because they are at
> variance with our nature and lead us to
> despair. (Scruton, 2002, p. 78)

Emotions and Passions. Spinoza thought that the experience of *passion* is one that reduces the probability of survival. Unlike an *emotion*, which is linked to a specific thought, passion is not associated with any particular thought. So, Spinoza distinguishes between emotions and passions. A child's love for its mother is an emotion, whereas a general emotional upheaval exemplifies passion because it is not directed at anything specific. Because passion can cause nonadaptive behavior, it must be harnessed by reason.

Behavior and thoughts guided by reason are conducive to survival, but behavior and thoughts guided by passion are not. By understanding the causes of passion, reason gives one the power to control passion, just as knowing why rivers flood villages allows the control of floods. Spinoza's insistence that we can improve ourselves by clarifying our ideas through an analysis of them and by rationally controlling our passions comes very close to Freudian psychoanalysis. In fact, if we replace the term *passion* with *unconscious determinants of behavior*, we see how similar Spinoza's position is to Freud's. In their history of psychiatry, Alexander and Selesnick (1966) actually refer to Spinoza as the greatest of the pre-Freudian psychologists.

Starting with a few basic emotions such as pleasure and pain, Spinoza showed how as many as 48 additional emotions could be derived from the interactions between these basic emotions and various situations encountered in life. A few examples show how the basic emotions interact with one another and how they can be transferred from one object or person to another. Spinoza (Elwes, 1955) said that if something is first loved and then hated, it will end up being hated more than if it were not loved in the first place. If objects cause us pleasure or pain, we will not only love and hate those objects, respectively, but will also love and hate objects that resemble them. Pondering ideas of events that have caused both pleasure and pain arouses the conflicting emotions of love and hate. Images of pleasurable or painful events remembered from the past or projected into the future cause as much pleasure or pain as those events would in the present. If anything produces pleasurable feelings in an object of our love, we will tend to love that thing, or conversely, if something causes pain in something we love, we will tend to hate that thing. If someone creates pleasure in something we hate, we will hate him or her, or conversely, if someone causes pain in something we hate, we will tend to love him or her.

Spinoza (Elwes, 1955) discussed the following emotions and showed that all involve the basic emotions of pleasure or pain: wonder, contempt, love, hatred, devotion, hope, fear, confidence, despair, joy, disappointment, pity, indignation, jealousy, envy, sympathy, humility, repentance, pride, honor, shame, regret, gratitude, revenge, cowardice, ambition, and lust. No one prior to Spinoza had treated human emotions in so much detail.

Spinoza's Influence

Descartes's is usually cited as the beginning of modern philosophy, yet with the possible exception of what Descartes said about physiology, most of his ideas have not been amenable to scientific analysis—for example, his mind–body dualism, his beliefs in free will and innate ideas, and the teleological bases of much of his theorizing. Bernard (1972) believes that Spinoza should be given more credit than Descartes for influencing the development of modern psychology: "Considering just the broad general scientific principles that are at the basis of modern scientific psychology, we find them paramount in Spinozistic but lacking in Cartesian thought" (p. 208). Bernard offers Spinoza's belief in *psychic determinism* as a principle that stimulated a scientific analysis of the mind:

> One of these important principles [from Spinoza's philosophy] is that of *psychic determinism*, the assumption of which clearly leads to the scientific attitude that the processes of the mind, too, are subject to natural laws, and that these laws can be consequently investigated and studied. Thus Spinoza, combating the teleological notion that nature acts "with an end in view," goes on to speak of a strict determinism ruling all psychological processes. (p. 208)

Watson (1978) also referred to Spinoza's pioneering efforts:

> Spinoza was perhaps the first modern thinker to view the world, including man, from a strictly deterministic standpoint. Both mind and body are of equal status, and both are subject to natural law. Spinoza saw clearly that his deterministic view of man required that there be laws of nature which are applicable to man. (p. 167)

We have already noted the similarity between Spinoza's philosophy and psychoanalytic thinking. Both stress that unclear thoughts should be made clear and that the passions should be controlled by the rational mind. We will see in Chapters 8 and 9 that Spinoza's philosophy had a strong influence on two individuals who were instrumental in launching psychology as an experimental science: Gustav Fechner and Wilhelm Wundt.

Before turning to other rational philosophers and psychologists, we first briefly review another position on the mind–body relationship that was espoused in Spinoza's time. We mention Malebranche's position mainly to show that almost every conceivable relationship between the mind and body has been proposed at one time or another.

Nicolas De Malebranche

A mystically oriented priest, **Nicolas de Malebranche (1638–1715)** accepted Descartes's separation of the mind and body but disagreed with his explanation of how the two interacted. For Malebranche, God mediated mind and body interactions. For example, when a person has a desire to move an arm, God is aware of this desire and moves the person's arm. Similarly, if the body is injured, God is aware of this injury and causes the person to experience pain. In reality, there is no contact between mind and body, but there appears to be because of God's intervention. A wish to do something becomes the occasion for God to cause the body to act, and for that reason this viewpoint became known as **occasionalism**. This view of the mind–body relationship can be referred to as a parallelism with divine intervention. Without divine intervention, the activities of the mind and body would be unrelated, and we would have psychophysical parallelism. (Malebranche's position on the mind–body relationship is depicted in Figure 1.1.) Malebranche reverted to a much earlier explanation of the origins of knowledge, suggesting that ideas are not innate and that they do not come from experience. Instead, they come only from God, and we can know only what God reveals to our souls.

GOTTFRIED WILHELM VON LEIBNIZ

Gottfried Wilhelm von Leibniz (1646–1716) was born in Leipzig, Germany, and was a truly great mathematician. In fact, he developed differential and integral calculus at about the same time that Newton did, although he did so independently of Newton. Leibniz lived during intellectually stimulating times. He was a contemporary of Hobbes, Spinoza, and Locke; Malebranche died a year before Leibniz, and Newton died just 11 years later. His father was a professor of moral philosophy at the University of Leipzig, which Leibniz entered at the age of 15. His early education included the Greek and Roman classics and the works of Bacon, Descartes, and Galileo. He earned a doctorate in law at the age of 20.

Disagreement with Locke

Although Descartes died when Leibniz was four years old, Descartes's philosophy still dominated Europe when Leibniz entered into his productive years. Leibniz's first work, however, was a criticism of Locke's *Essay* (1690). Although his rebuttal of Locke's philosophy, *New Essays on the Understanding*, was completed in 1704, it was not published until almost 50 years after Leibniz's death in 1765. The delay was caused by Locke's death in 1704, as Leibniz saw little point in arguing with the deceased.

Focusing on Locke's description of the mind as a *tabula rasa* (blank tablet), Leibniz attributed to Locke the belief that there is nothing in the mind that is not first in the senses. It seems that Leibniz misread Locke as believing that if the ideas derived from experience were removed from the mind, nothing would remain. We saw in Chapter 5, however, that Locke actually postulated a mind well stocked with innate abilities. In any case, Leibniz endeavored to correct Locke's philosophy as he understood it. Leibniz said that there is nothing in the mind that is not first in the senses, *except the mind itself*. Instead of the passive mind that Leibniz believed Locke proposed, Leibniz postulated a highly active mind, but he then went even further. Leibniz completely rejected Locke's suggestion that

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Gottfried Wilhelm von Leibniz

all ideas come from experience, saying instead that *no* ideas come from experience.

Leibniz believed that nothing material (such as the activation of a sense receptor) could ever cause an idea that is nonmaterial. Leibniz was also a forerunner of modern computer science (Glymour et al., 1995), and developed actual calculating machines. His Stepped Reckoner was an improvement upon a design first conceived by Blaise Pascal (1623–1662), and could multiply and divide. He imagined other machines that could be programmed to think—much like modern advances in artificial intelligence. Leibniz beckons us to consider such a machine capable of thinking, then he asks us to imagine increasing the size of the machine to the point where we could enter it and look around. According to Leibniz, our exploration would yield only interacting, physical parts. Nothing we would see, whether examining the machine or a human being, could possibly explain the origin of an idea. Because ideas cannot be created by anything physical like a brain, the *potential* to have an idea must be innate. Experience can cause a potential idea to be actualized, but it can never create an idea. Leibniz (1765/1982) made this point with his famous metaphor of the marble statue:

> Reflection is nothing but attention to what is within us, and the senses do not give us what we carry with us already … I have … used the analogy of a veined block of marble, as opposed to an entirely homogeneous block of marble, or to a blank tablet—what the philosophers call a *tabula rasa*. For if the soul were like such a blank tablet then truths would be in us as the shape of Hercules is in a piece of marble when the marble is entirely neutral as to whether it assumes this shape or some other. However, if there were veins in the block which marked out the shape of Hercules rather than other shapes, then that block would be more determined to that shape and Hercules would be innate in it, in a way, even though labour would be required to expose the veins and to polish them into clarity, removing everything that prevents their being seen. This is how ideas and truths are innate in us—as inclinations, dispositions, tendencies, or natural potentialities. (pp. 45–46)

Monadology

Leibniz combined physics, biology, introspection, and theology into a worldview that was both strange and complex. One of Leibniz's goals was to reconcile the many new, dramatic scientific discoveries with a traditional belief in God. As we have seen, Spinoza attempted to do much the same thing by equating God and nature, thus eliminating any friction between religion and science. Leibniz's proposed solution to the problem was … different.

With the aid of the newly invented microscope, Leibniz could see that life exists everywhere, even where the naked eye cannot perceive it. He believed that the division of things into living or nonliving was absurd. Instead, he concluded that everything was living. The universe consisted of an infinite number of life units called **monads**. A monad (from the Greek *monas*, meaning "single") is like a living atom, and all monads are active and

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conscious. There is a hierarchy in nature, however, similar to the *scala naturae* Aristotle proposed. Although all monads are active and conscious, they vary in the clarity and distinctiveness of the thoughts they are capable of having. In other words, monads differ in intelligence. What is sometimes called inert matter is made up of monads incapable of all but extremely muddled thoughts. Then, on a scale of gradually increasing intelligence, come plants, microbes, insects, animals, humans, and God. Differences among all things in the universe, then, are quantitative, not qualitative. All monads seek to clarify their thoughts, insofar as they are capable, because clear thinking causes pleasure. Here is an important point of agreement between Aristotle and Leibniz, because Leibniz viewed a monad as a potential seeking to become actualized. In other words, each monad, and therefore all of nature, was characterized by a final cause or purpose.

Next to God, humans possess the monads capable of the clearest thinking. However, because humans consist of all types of monads ranging from those possessed by matter, plants, and animals, our thoughts are not always clear. It was Leibniz's claim, then, that organisms are aggregates of monads representing different levels of conscious awareness. However, again following Aristotle, he believed that each organism had a soul (mind) that dominated its system; it is this dominant monad that determines an organism's intellectual potential. It is the nature of humans' dominant monad (soul) that provides them with intellectual potential inferior only to God's. Monads, according to Leibniz, can never be influenced by anything outside of themselves. Therefore, the only way that they can change (become clearer) is by internal development—that is, by actualizing their potential.

Mind–Body Relationship

As we have seen, Leibniz believed experience was necessary because it focused attention on the thoughts already in us and allowed us to organize our thoughts and act appropriately, but experience cannot cause ideas. For this reason, Leibniz rejected mind–body dualism. That is, he rejected Descartes's interactionism because it is impossible for something physical to cause something mental. Leibniz also rejected Malebranche's occasionalism because he thought that it was untenable to believe that the mind and body were coordinated through God's continuous intervention. In place of interactionism and occasionalism, Leibniz proposed a **psychophysical parallelism** based on the notion of **preestablished harmony**.

Leibniz believed that the entire universe was created by God to be in perfect harmony, and yet nothing in the universe actually influences anything else. There is a correspondence between each monad's perceptual state and the conditions external to it, but those perceptions can be said only to "mirror" the external events rather than be caused by them. Similarly, the monads that make up the mind and those that make up the body are always in agreement because God planned it that way, not because they are causally related. Leibniz asks that we imagine two identical, perfect clocks that have been set to the same time at the same moment. Afterward, the clocks will always be in agreement but will not interact. According to Leibniz, all monads, including those constituting the mind and the body, are like such clocks. (Figure 1.1 depicts Leibniz's preestablished harmony form of psychophysical parallelism.)

Leibniz's monadology has been criticized for several reasons, although a few of its essential features influenced later developments in philosophy and psychology. One criticism was that monadology suggested that because God created the world, it cannot be improved on. In Voltaire's *Candide*, Leibniz is portrayed as a foolish professor who continues to insist, even after observing tragedy after tragedy, that "this is the best of all possible worlds."

Conscious and Unconscious Perception

For Leibniz, the notion of "insensible perceptions" was as useful to psychology as the notion of insensible atoms was to physics. In both cases, what is actually experienced consciously is explained in terms of events beyond the realm of conscious experience. Leibniz (1765/1982) summarized this belief in his **law of continuity** (not to be confused with the law of contiguity):

> Nothing takes place suddenly, and it is one of my great and best confirmed maxims that *nature never makes leaps*. I called this the Law of Continuity … There is much work for this law to do in natural science. It implies that any change from small to large, or vice versa, passes through something which is, in respect of degrees as well as of parts, in between; and that no motion ever springs immediately from a state of rest, or passes into one except through a lesser motion; just as one could never traverse a certain line or distance without first traversing a shorter one. Despite which, until now those who have propounded the laws of motion have not complied with this law, since they have believed that a body can instantaneously receive a motion contrary to its preceding one. All of which supports the judgment that noticeable perceptions arise by degrees from ones which are too minute to be noticed. To think otherwise is to be ignorant of the immeasurable fineness of things, which always and everywhere involves an actual infinity. (p. 49)

To demonstrate the fact that there are no leaps even in the realm of perception, Leibniz (1765/1982) used the example of perceiving the roar of the sea:

> To give a clearer idea of these minute perceptions which we are unable to pick out from the crowd, I like to use the example of the roaring noise of the sea which impresses itself on us when we are standing on the shore. To hear this noise as we do, we must hear the parts which make up this whole, that is the noise of each wave, although each of these little noises makes itself known only when combined confusedly with all the others, and would not be noticed if the wave which made it were by itself. We must be affected slightly by the motion of this wave, and have some perception of each of these noises, however faint they may be; otherwise there would be no perception of a hundred thousand waves, since a hundred thousand nothings cannot make something. Moreover, we never sleep so soundly that we do not have some feeble and confused sensation; some perception of its start, which is small, just as the strongest force in the world would never break a rope unless the least force strained it and stretched it slightly, even though that little lengthening which is produced is imperceptible. (p. 47)

Leibniz called perceptions that occurred below the level of awareness **petites perceptions** (little perceptions). As petites perceptions accumulate, their combined force is eventually enough to cause conscious awareness, or what Leibniz called **apperception**. Therefore, a continuum exists between unconscious sensation and conscious perception. Leibniz was perhaps the first philosopher then to clearly postulate an unconscious mind.

Leibniz also introduced the concept of **limen**, or threshold, into psychology. We are aware of experiences above a certain aggregate of petites perceptions, but experiences below that aggregate (threshold) remain unconscious. Leibniz's concept of threshold was to become extremely important when psychology became a science in the late 1800s. We will see later in this chapter that Leibniz's philosophy had a strong influence on Johann Friedrich Herbart, who in turn influenced many others. The implications of Leibniz's notion of unconscious perception for the development of psychoanalysis are also clear. With his notion of the hierarchy of consciousness, Leibniz encouraged the study of consciousness in animals. It was not until Darwin, however, that the study of animal consciousness and intelligence was pursued intensely.

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Leibniz's philosophy has received mixed reviews from historians of psychology. On the negative side, we have opinions such as Esper's (1964) assessment:

> In Leibniz … we have the classic example of what happens to "psychology" at the hands of a philosopher whose main interests and intellectual apparatus are theology, mathematics, and logic, and who uses the concepts of physical and biological science in the service of metaphysical speculation; we have in Leibniz a seventeenth-century Parmenides. (p. 224)

Although his position as one of the greatest mathematicians in history is undisputed, Esper (1964) concludes, "It is, I think, obvious that Leibniz foisted upon psychology a vast tangle of linguistic blind alleys which occupied its attention and its books and journals down until the 1920s, and which still determine much of its nonexperimental, intuitive literature" (p. 228).

On the positive side, Brett (1912–1921/1965) observed, "The work of Leibniz was so brilliant and so full of inspiration that it has often seemed to be the spontaneous birth of German philosophy" (p. 406). It was Leibniz's view of the human mind that dominated German rationalistic philosophy for many years. Brett described that view: "Leibniz emphasized the spontaneity of the soul; for him the work of the mind was something more than a mere arranging, sorting, and associating of the given; it was essentially productive, creative, and freely active" (p. 407). Similarly, Fancher and Schmidt (2003) say, "Leibniz offered a strong argument that the human mind cannot be understood simply as a passive reflector of the things it experiences, but rather is itself an important contributor to its experience" (p. 16).

Leibniz's pupil Christian von Wolff (1679–1754) was among the first to use the term *psychology* in a book title (*Empirical Psychology*, 1732; and *Rational Psychology*, 1734). Indeed, Boring (1966) notes that Wolff did much to popularize psychology. Specifically, Wolff's two books showed how empiricism and rationalism could be contrasted when applied to matters of psychology, and noted the different methods of inquiry concerning psychological phenomena that followed from each. Wolff was also among the first modern philosophers to describe the mind in terms of faculties, or powers. Wolff's faculty psychology had a significant influence on Immanuel Kant (discussed later in this chapter).

THOMAS REID

Thomas Reid (1710–1796) was born in Strachan, a parish about 20 miles from Aberdeen, Scotland, where his father served as a minister for 50 years. His mother was a member of a prominent Scottish family, and one of his uncles was a professor of astronomy at Oxford and a close friend of Newton. Like Hume, Reid was a Scotsman; but unlike Hume, Reid represented rationalism instead of empiricism. Reid defended the existence of reasoning powers by saying that even those who claim that reasoning does not exist are using reasoning to doubt its existence. The mind reasons and the stomach digests food, and both do their jobs because they are innately designed to do so. Reid thought that reason is necessary so that we can control our emotions, appetites, and passions and understand and perform our duty to God and other humans.

Hume argued that because all we could ever experience were sense impressions, everything that we could possibly know must be based on them alone. For Hume then, knowledge of such things as God, the self, causality, and even external reality was simply unattainable. Reid emphatically disagreed with Hume, saying that because we do have such knowledge, Hume's argument must be faulty. Reid presented his arguments against Hume and the other empiricists in *An Inquiry into the Human Mind on the Principles of Common Sense* (1764), *Essays on the Intellectual Powers of Man* (1785), and *Essays on the Active Powers of the Human Mind* (1788). Reid put forth his **common-sense philosophy** mainly in the first of these and his faculty psychology mainly in the last two.

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Prof. Thomas Reid D.D.

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Thomas Reid

Portrait of Thomas Reid by Sir Henry Raeburn. 1796. Oil on canvas. National Trust for Scotland, Fyvie Castle, Aberdeenshire, UK.

Common Sense

Reid argued that because all humans were convinced of the existence of physical reality, it must exist. Furthermore, in courts of law, eyewitness testimony is highly valued:

> By the laws of all nations, in the most solemn judicial trials, wherein men's fortunes and lives are at stake, the sentence passes according to the testimony of eye or ear witnesses of good credit. An upright judge will give a fair hearing to every objection that can be made to the integrity of a witness, and allow it to be possible that he may be corrupted; but no judge will ever suppose that witnesses may be imposed upon by trusting to their eyes and ears. And if a sceptical counsel should plead against the testimony of the witnesses, that they had no other evidence for what they declared but the testimony of their eyes and ears, and that we ought not to put so much faith in our senses as to deprive men of life or fortune upon their testimony, surely no upright judge would admit a plea of this kind. I believe no counsel, however sceptical, ever dared to offer such an argument; and, if it was offered, it would be rejected with disdain.
>
> Can any stronger proof be given that it is the universal judgment of mankind that the evidence of sense is a kind of evidence which we may securely rest upon in the most momentous concerns of mankind; that it is a kind of evidence against which we ought not to admit any reasoning; and, therefore that to reason either for or against it is an insult to common sense?
>
> The whole conduct of mankind in the daily occurrences of life, as well as the solemn procedure of judicatories in the trial of causes civil and criminal, demonstrates this.… It appears, therefore, that the clear and distinct testimony of our senses carries irresistible conviction along with it to every man in his right judgment. (Beanblossom & Lehrer, 1983, pp. 161–163)

If Hume's logic led him to conclude that we could never know the physical world, then something was wrong with Hume's logic, said Reid. We can trust our impressions of the physical world because it makes *common sense* to do so. We are naturally endowed with the abilities to deal with and make sense out of the world. According to Reid, "When a man suffers himself to be reasoned out of the principles of common sense, by metaphysical arguments, we may call this *metaphysical lunacy*" (Beanblossom & Lehrer, 1983, pp. 118–119).

Reid described what life would be like if we did not assume that our senses accurately reflect reality:

> I resolve not to believe my senses. I break my nose against a post that comes in my way; I step into a dirty kennel; and after twenty such wise and rational actions I am taken up and clapped into a madhouse. (Beanblossom & Lehrer, 1983, p. 86)

People may *say* that they do not know if their sensations accurately reflect the physical world as

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Hume did, but everyone—including Hume—assumes that they do. To assume otherwise, according to Reid, is grounds for confinement.

Direct Realism

To Reid, our sensations not only accurately reflect reality but also do so immediately. The belief that the world is as we immediately experience it is called **direct realism** (sometimes also called naive realism; see Henle, 1986). Although, as we see next, Reid was clearly a rationalist, he did not believe that the rational mind needed to be employed in experiencing the environment accurately; nor did he believe that the associationistic principles of the empiricists were required. In other words, Reid did not believe that our conscious awareness of the world was formed by one sensation being added to another. Rather, we experience objects immediately as objects because of our innate power of perception. We perceive the world *directly* in terms of meaningful units, not as isolated sensations that are then combined via associative principles. We will see this belief again in Kant's philosophy (discussed shortly) and later in Gestalt psychology (Chapter 14).

Reid (1785/1969) explained:

> The Supreme Being intended, that we should have such knowledge of the material objects that surround us, as is necessary in order to our supplying the wants of nature, and avoiding the dangers to which we are constantly exposed; and he has admirably fitted our powers of perception to this purpose. [If] the intelligence we have of external objects were to be got by reasoning only, the greatest part of men would be destitute of it; for the greatest part of men hardly ever learn to reason; and in infancy and childhood no man can reason. Therefore, as this intelligence of the objects that surround us, and from which we may receive so much benefit or harm, is equally necessary to children and to men, to the ignorant and to the learned, God in his wisdom conveys it to us in a way that puts all upon a level. The information of the senses is as perfect, and gives as full conviction to the most ignorant, as to the most learned. (p. 118)

Faculty Psychology

In elaborating the innate powers of the mind, Reid discussed several *faculties*. Faculty psychologists (or philosophers) are those who refer to various mental abilities or powers in their descriptions of the mind. Through the years, **faculty psychology** has often been misunderstood or misrepresented. Frequently, it has been alleged that faculty psychologists believed that a faculty of the mind was housed in a specific location in the brain. Except for the phrenologists (see Chapter 8), however, this was seldom the case. It was also alleged that faculties were postulated instead of explaining a complex mental phenomenon. People perceive, for example, because they have the faculty of perception. However, it was seldom the case that faculty theorists used the faculties to *explain* mental phenomena. Most often the term *faculty* denoted a mental ability of some type, and that was all:

> The word "faculty" was in frequent use in 17th century discussions of the mind. Locke himself used it freely, being careful to point out that the word denoted simply a "power" or "ability" to perform a given sort of action (such as perceiving or remembering), that it did not denote an agent or substance, and that it had no explanatory value. To Locke and to all subsequent thinkers a "faculty" was simply a classificatory category, useful only in a taxonomic sense. (Albrecht, 1970, p. 36)

Although Albrecht's observation that faculty psychologists used the term *faculty* as only a classificatory category may be generally true, it was not true of Reid. For Reid, the mental faculties were active powers of the mind; they actually existed and influenced individuals' thoughts and behavior. For Reid, however, the mental faculties were aspects of a

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single, unifying mind, and they never functioned in isolation. That is, when a faculty functioned, it did so in conjunction with other faculties. For Reid, the emphasis was always on the unity of the mind:

> The most fundamental entity in Reid's psychology is the mind. Although introspection reveals many different types of thoughts and activities, Reid assumed—in common with most other faculty psychologists—the existence of a unifying principle. This principle he termed mind or soul; the mind might have a variety of powers, but these are only different aspects of the same substance. (Brooks, 1976, p. 68)

To summarize, we can say that Reid believed the faculties were aspects of the mind that actually existed and influenced human behavior and thought. All the faculties were thought to be innate and to function in cooperation with other faculties. After a careful review of Reid's works, Brooks (1976) concluded that Reid had referred to as many as 43 faculties of the mind, including abstraction, attention, consciousness, deliberation, generalization, imitation, judgment, memory, morality, perception, pity and compassion, and reason. In Chapter 8, we will discuss how faculty psychology influenced the development of the infamous field of phrenology.

In time, Reid's work became the foundation for what has been called the "Scottish School" of psychology. His disciples, such as Dugald Stewart and Thomas Brown influenced James Mill and later associationists as they sought to reconcile rationalism and empiricism with respect to moral philosophy. The Scottish School, in part because they wrote in English, also provided the basis of the earliest American academic views on psychology.

IMMANUEL KANT

Immanuel Kant (1724–1804) was born in Konigsberg, Prussia. He was the fourth of nine children born to a poor harness maker and his wife, both of whom were devout Lutherans. Interestingly, Kant never traveled more than 40 miles from his birthplace in the 80 years of his life (Boring, 1950). Wolman (1968a) nicely summarizes the type of life that Kant lived:

> Several armchairs played an important role in the history of human thoughts, but hardly any one of them could compete with the one occupied by Immanuel Kant. For Kant led an uneventful life: no change, no travel, no reaching out for the unusual, not much interest outside his study-room and university classroom. Kant's life was a life of thought. His pen was his scepter, desk his kingdom, and armchair his throne.
>
> Kant was more punctual and more precise than the town clocks of Konigsberg. His habits were steadfast and unchangeable. Passersby in Konigsberg regulated their watches whenever they saw Herr Professor Doktor Immanuel Kant on his daily stroll. Rain or shine, peace or war, revolution or counterrevolution had less affect on his life than a new book he read, and certainly counted less than a new idea that grew in his own mind. Kant's thoughts were to him the center of the universe. (p. 229)

Kant was educated at the University of Konigsberg and taught there until he was 73, when he resigned because he was asked to stop including his views on religion in his lectures. He became so famous in his lifetime that philosophy students came from all over Europe to attend his lectures, and he had to keep changing restaurants to avoid admirers who wanted to watch him eat his lunch. When Kant died, on February 12, 1804, his funeral created gridlock in Konigsberg. The city bells tolled and a procession of admirers, numbering in the thousands, wound its way to the university cathedral. Among his many famous books, Kant's *Critique of Pure Reason* (1781/1990) and *Critique of Practical Reason* (1788/1996) largely set the tone of both German rationalist philosophy and of psychology for generations.

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Kant started out as a disciple of Leibniz, but reading Hume's philosophy caused him to wake from his "dogmatic slumbers" and attempt to rescue philosophy from the skepticism that Hume had generated toward it. Hume had argued that all conclusions we reached about anything were based on subjective experience because that was the only thing we ever encountered directly. According to Hume, all statements about the nature of the physical world or about morality derive from impressions, ideas, and the feelings that they aroused, as well as from the way all these were organized by the laws of association. Even causation, which was so important to many philosophers and scientists, was reduced to a habit of the mind in Hume's philosophy. For example, even if B (a billiard ball moving across the felt) always follows A (the cue ball striking the billiard ball) and the interval between the two is always the same, we can never conclude that A causes B because there is no way for us to verify an actual, causal relationship between the two events (that is, we do not see a force vector exchanged between the two balls). For Hume, rational philosophy, physical science, and moral philosophy all reduced to subjective psychology. Therefore, nothing could be known with certainty because all knowledge was based on the interpretation of subjective experience.

Categories of Thought

Kant set out to prove Hume wrong by demonstrating that some truths were certain and were not based on subjective experience alone. He focused on Hume's analysis of the concept of causation. Kant agreed with Hume that this concept corresponds to nothing in experience. In other words, nothing in our experience proves that one thing causes another. But, asked Kant, if the notion of causation does not come from experience, *where does it come from*? Kant argued that the very ingredients necessary for even thinking in terms of a causal relationship could not be derived from experience and therefore must exist a priori, or before experience.

Kant did not deny the importance of sensory data, but he thought that the mind must add something to that data before knowledge could be attained; that something was provided by the a priori (innate) **categories of thought**. According to Kant, what we experience subjectively has been modified by the pure concepts of the mind and is therefore more meaningful than it would otherwise have been. Kant included the following in his list of a priori pure concepts, or categories of thought: unity, totality, time, space, cause and effect, reality, quantity, quality, negation, possibility-impossibility, and existence-nonexistence.

Without the influence of the categories, we could never make statements such as those beginning with the word *all* because we never experience all of anything. According to Kant, the fact that we are willing at some point to generalize from several particular experiences to an entire class of events merely specifies the conditions under which we employ the innate category of totality, because the word *all* can never be based on experience. In this way, Kant showed that, although the empiricists had been correct in stressing the importance of experience, a further analysis of the very experience to which the empiricists referred revealed the operations of an active mind. For Kant, "a mind without concepts would have no capacity to think; equally, a mind armed with concepts, but with no sensory data to which they could be applied, would have nothing to think about" (Scruton, 2001, p. 35).

Although it is an imperfect example, perhaps you or someone you know has the habit of hastily scrawling themselves short, telegraphic notes such as phone numbers on bits of scrap paper. When considered later, and written as they are—among or even over other text—they may be unintelligible. Even if you can read them, you may not recall when you wrote them, or who they connect with. Contrast this with a person who dutifully keeps an address book. That is, who uses the structure of the preprinted page to neatly record a new phone number with names, dates, etc. As we will see, for Kant, the categories—such as those of space and time—were like the preprinted pages in that address book. That is, they provided an organizing structure that allows us to sensibly take in and record our new information.

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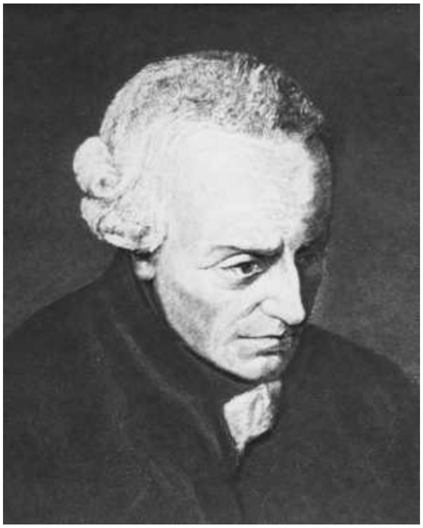
Causes of Mental Experience

Kant agreed with Hume that we never experience the physical world directly, and therefore we can never have certain knowledge of it. However, for Hume, our cognitions consist only of sense impressions, ideas, and combinations of these arranged by the laws of association. For Kant, there was much more. Kant believed our sensory impressions are always structured by the categories of thought, and our *phenomenological experience* is therefore the result of the interaction between sensations and the categories of thought. This interaction is inescapable. Even when physical scientists believe that they are describing the physical world, they are really describing the human mind. For Kant, the mind prescribed the laws of nature. Kant, in this sense, was even more revolutionary than Copernicus because, for Kant, the human mind became the center of the universe. In fact, our mind, according to Kant, creates the universe—at least as we experience it. Kant called the objects that constitute physical reality "things-in-themselves" or noumena, and it is noumena about which we are forever and necessarily ignorant. We can know only appearances (phenomena) that are regulated and modified by the categories of thought. Aware of the radical nature of his assertions, Kant himself said that they represented a "Copernican revolution" in philosophy.

Because Kant postulated categories of thought, he can be classified as a faculty psychologist. He was a faculty psychologist in the way that Reid was, however. That is, he postulated a single, unified mind that possessed various attributes or abilities. The attributes always interacted and were not housed in any specific location in the mind and certainly not in the brain.

Perception of Time. Even the concept of time is added to sensory information by the mind. On the sensory level, we experience a series of separate events, such as the image provided by a horse walking down the street. We see the horse at one point and then at another and then at another and so forth. Simply looking at the isolated sensations, there is no reason to conclude that one sensation occurred before or after another. Yet, this is exactly what we do conclude; and because there is nothing in the sensations themselves to suggest the concept of time, the concept must exist a priori. Similarly, there is no reason—at least no reason based on experience—that an idea reflecting a childhood experience should be perceived as happening a long time ago. All notions of time such as "long ago," "just recently," "only yesterday," "a few moments ago," and so forth cannot come from experience; thus, they must be provided by the a priori category of time. All there is in memory are ideas that can vary only in intensity or vividness; it is the mind itself that superimposes over these experiences a sense of time. Thus, Kant concluded that the experience of time could be understood only as a creation of the mind.

In fact, Kant indicated that Hume's description of causation as perceived correlation depended on the concept of time. That is, according to Hume, we develop the habit of expecting one event to follow another if they typically are correlated. However, without the notion of before and after (that is, of time), Hume's analysis would be meaningless. Thus, according to Kant, Hume's analysis of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Immanuel Kant

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causation assumed at least one innate (a priori) category of thought.

Perception of Space. Kant also believed that our experience of space was provided by an innate category of thought. Kant agreed with Hume that we never experience the physical world directly, but he observed that it certainly seems that we do. For most, if not all, humans, the physical world appears to be laid out before us and to exist independently of us. In other words, we do not simply experience sensations as they exist on the retina or in the brain. We experience a display of sensations that seem to reflect the physical world. The sensations vary in size, distance, and intensity and seem to be distributed in *space*, not in our retinas or brains. Clearly, said Kant, such a projected spatial arrangement is not provided by the sensory impressions themselves.

Sensations are all internal; that is, they exist in the mind alone. Why is it, then, that we experience objects as distributed in space as external to the mind and the body? Again, Kant's answer was that the experience of space, like that of time, was provided by an a priori category of thought. According to Kant, the innate categories of time and space are basic because they provide the context for all mental phenomena, including (as we have seen) causality.

It must be emphasized that Kant did not propose specific innate *ideas*, as Descartes had done. Rather, he proposed innate *categories* of thought that organized all sensory experience. Thus, both Descartes and Kant were nativists, but their brands of nativism differed significantly.

The Categorical Imperative

Kant also attempted to rescue ethics from what the empiricists had provided—utilitarianism. For Kant, it was not enough to say that certain experiences are good and others are not; he asked what rule or principle was being applied to our feelings that made them desirable or undesirable. He called the rational principle that governs (or should govern) moral behavior the **categorical imperative**, according to which, "I should never act except in such a way that I can also will that my maxim should become a universal law" (Kant, 1785/1981, p. 14). Kant gave as an example the maxim "Lying under certain circumstances is justified." If such a maxim were elevated to a universal moral law, the result would be widespread distrust and social disorganization. On the other hand, if the maxim "Always tell the truth" were made a universal moral law, social trust and harmony would be facilitated. According to Kant, if everyone made their moral decisions according to the categorical imperative, the result would be a community of free and equal members. Of course, Kant realized that he was describing an ideal that could only be approximated. He also realized that he was not adding anything new to moral philosophy. His categorical imperative was similar to older moral precepts such as the golden rule ("Do unto others as you would have them do unto you"). Kant's intent was to clarify the moral principle embedded in such moral precepts as the golden rule.

Whereas the empiricists' analysis of moral behavior emphasized a sort of hedonic calculus—that the best option produced the greatest good—Kant's was based on a rational principle and a belief in free will. For Kant, the idea of moral responsibility was meaningless unless rationality and free will were assumed. We have here a clear example of the distinction between the reasons for, and the causes of, behavior. For the empiricists, behavior (moral or otherwise) is caused by feelings of pleasure and pain. For Kant, there is a reason for acting morally and, if that reason is freely chosen, *moral* behavior results.

Kant wrote an essay (1763/1994) purporting to rationally demonstrate God's existence. His argument diverged from a number of traditional arguments, such as the ontological argument (see Chapter 3) and, therefore, he was critical of both Descartes and Leibniz, who had both accepted a version of that argument. The details need not concern us here but, in general, Kant's argument for the necessity of God's existence was similar to Aristotle's argument for the necessity of an unmoved mover (see Chapter 2). Kant, of course, believed

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that all arguments except his were wrong. The essay received considerable acclaim, but the Catholic church was not impressed and placed the work on its index of forbidden books (Treash, 1994).

Kant's Influence

Kant's rationalism combined both sensory experience and innate faculties. Kant has had a considerable influence on psychology, and since Kant's time, a lively debate in psychology has ensued concerning the importance of innate factors in such areas as perception, language, cognitive development, and problem solving. Kant's most direct influences on modern psychology are seen in Gestalt psychology, which we will consider in Chapter 14, and in cognitive psychology, which we will consider in Chapter 19.

Another commonly cited example of Kant's relevance to modern psychology is the work of perceptual theorist J. J. Gibson (1904–1979) and his wife Eleanor Gibson (1910–2002). J. J. Gibson sought to reconcile the perceptual theories of the Gestalt psychologists with behaviorism. Although he disdained comparisons to philosophy (Shaw, 2002), Gibson's theory of perception is built around the concept of affordances, or perceptual information that we are innately designed (for Gibson, by our evolutionary ecological niche) to understand and which guides our behavior. That is, we do not have to learn from experience what objects we can sit upon or grasp in our hand, just seeing them gives us that information. Likewise, we do not learn by trial and error what we can throw—we know it from the sensory feedback our palms and fingers provide. A sheet of notebook paper is too light and too large to throw, but a wadded-up page fits perfectly in the hand.

Perhaps the best example is Eleanor Gibson's work with the visual cliff, a research paradigm where the behavior of infants with no previous experience with falling is examined. Could infants be lured across a (seeming) ledge given that they had no experience of falling? Gibson's results suggest that humans (and other animals that could be harmed by falling) have eyes that readily detect edges (which can cause falling) and an innate avoidance of such edges. Edges then offer the affordance of falling, and even as infants we innately recognize them as dangerous.

Empirically oriented psychologists, such as the behaviorists we will consider in Chapters 12 and 13, usually insist that psychological processes are best explained as resulting from sensory experience, learning, and the passive laws of association—all following in the tradition of British empiricism. Like Gibson, however, most modern rationalistically oriented psychologists side with Kant by stressing the importance of genetically determined brain structures or operations.

Although Kant's influence was clearly evident when psychology emerged as an independent science in the late 1800s, Kant actually did not believe that psychology could become an experimental science. First, Kant claimed the mind itself could never be objectively studied because it is not a physical thing. Second, the mind cannot be studied scientifically using introspection because it does not stand still and wait to be analyzed; it is constantly changing and therefore cannot be reliably examined. Also, the very process of introspection influences the state of the mind, thus limiting the value of what is found through such reflection. Like most philosophers in the rationalistic tradition, Kant believed that to be a science, a discipline's subject matter had to be capable of precise mathematical formulation, and this was not the case for psychology.

Kant defined psychology as the introspective analysis of the mind, and he believed that psychology so defined could not be a science. There was a way of studying humans, however, that, although not scientific, could yield useful information; that way was to study *how* people actually behave. Such a discipline, which Kant called **anthropology**, could even supply the information necessary to predict and control human behavior. Kant was very interested in his field of anthropology and lectured on it for years before publishing *Anthropology from a Pragmatic Point of View* (1798/1912). *Anthropology* is a most interesting and even amusing book. It includes among its many topics insanity, gender differences, suggestions for a good marriage, clear thinking, advice to authors, human intellectual faculties, personality types, human appetites, and the imagination.

GEORG WILHELM FRIEDRICH HEGEL

Georg Wilhelm Friedrich Hegel (1770–1831) was born in Stuttgart, Germany. As a boy he first learned Latin from his mother, then later, at the University of Tubingen, he concentrated on the Greek and Roman classics (and theology). After receiving his doctorate in 1793, he studied the historical Jesus and what the best minds through history had thought the meaning of life to be. In 1799 Hegel's father died and left him a modest inheritance. He moved to the University of Jena, where he supplemented his income with the fees he collected from lecturing there. In Jena he fathered an illegitimate son; the mother was his landlady. In 1811, at 41, he married the daughter of a prominent family who was about half his age. Hegel and his wife had two sons of their own and also raised his illegitimate son (Singer, 2001). Hegel was forced to change teaching jobs several times because of political unrest in Europe, but in 1818 he accepted one of the most prestigious academic positions in Europe—the chair in philosophy at the University of Berlin. Hegel remained at Berlin until he contracted cholera during an epidemic; he died on November 14, 1831, at the age of 61.

The Absolute

Like Spinoza, Hegel saw the universe as an interrelated unity, which he called **the Absolute**. The only true understanding, according to Hegel, is an understanding of the Absolute. True knowledge can never be attained by examining isolated instances of anything unless those instances are related to the "whole." Russell (1945) described this aspect of Hegel's philosophy as follows:

> The view of Hegel, and of many other philosophers, is that the character of any portion of the universe is so profoundly affected by its relation to the other parts and to the whole, that no true statement can be made about any part except to assign its place in the whole. Thus, there can be only one true statement; there is no truth except the whole truth. And similarly nothing is quite real except the whole, for any part, when isolated, is changed in character by being isolated, and therefore no longer appears quite what it truly is. On the other hand, when a part is viewed in relation to the whole, as it should be, it is seen to be not self-subsistent, and to be incapable of existing except as part of just that whole which alone is truly real. (p. 743)

The process Hegel proposed for seeking knowledge was akin to the one Plato had proposed. First, one must recognize that sense impressions are of little use unless one can determine the general concepts that they exemplify. Once these concepts are understood, the next step is to determine how those concepts are related to one another. When one sees the interrelatedness of all concepts, one experiences the Absolute, which is similar to Plato's form of the good. Although Plato did not equate the form of the good with God, Hegel did equate the Absolute with God: "On its highest plane philosophy contemplates the concept of all concepts, the eternal absolute—the God who is worshipped in religion. Philosophy then culminates in speculative theology" (Hegel, 1817/1973, sec. 17). Although Hegel often disagreed with the details of church dogma (for example, he did not believe in miracles), two of his early books, *The Life of Jesus* (1795) and *The Spirit of Christianity* (1799), indicate a general sympathy toward Christian theology.

Hegel's belief that the whole is more important than particular instances led him to conclude that the state (government) was more important than the individuals that composed it. In other words, for Hegel, people existed for the state. This is exactly the opposite of Locke's position, which stated that the state existed for the people. Russell

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(1945) nicely summarized Hegel's view of the relationship between the individual and the state: "Hegel conceives the ethical relation of the citizen to the state as analogous to that of the eye to the body: In his place the citizen is part of a valuable whole, but isolated he is as useless as an isolated eye" (p. 743).

Dialectic Process

Hegel believed that both human history in general and the human intellect in particular evolved toward the Absolute via the **dialectic process**. Although the term *dialectic* has been used by philosophers in several ways, it generally means the attempt to arrive at truth by back-and-forth argumentation among conflicting views (for example, see Chapter 3 for Abelard's use of the dialectic method). In studying Greek history, Hegel observed that one philosopher would take a position that another philosopher would then negate; then a third philosopher would develop a view that was intermediate between the two opposing views. For example, Heraclitus said that everything was constantly changing, Parmenides said that nothing ever changed, and Plato said that some things changed and some did not. Hegel's version of the dialectic process involved a *thesis* (one point of view), an *antithesis* (the opposite point of view), and a *synthesis* (a resolution between the thesis and the antithesis). When a cycle is completed, the previous synthesis becomes the thesis for the next cycle, and the process repeats itself continually. In this manner, both human history and the human intellect evolve toward the Absolute.

In a sense, Hegel did to Kant what Kant had done to Hume. As we saw, Kant agreed with Hume that nothing in experience proves causation and yet we are convinced of its existence. Kant's explanation was that there is an a priori category of thought, which accounts for our tendency to structure the world in terms of cause and effect. Hegel accepted all Kant's categories of thought and added several more of his own. However, he raised an all-important question that Kant had missed: Why do the categories of thought exist? Kant began his philosophy by attempting to account for our notion of causation because he agreed with Hume that such a notion cannot be derived from experience. Similarly, Hegel began his philosophy by attempting to account for the existence of Kant's categories. Hegel's answer was that the categories emerged as a result of the dialectic process and, for that reason, they bring humans closer to the Absolute. For Hegel, then, the categories exist as a means to an end—the end being moving closer to the Absolute. Through the dialectic process, all things move toward the Absolute, including the human mind.

Hegel's most important work for psychology was his *Phänomenologie des Geistes*, where he introduces his dialectical process and concept of the Absolute. Interestingly, the book has been translated into English as both the *Phenomenology of Mind* and the *Phenomenology of Spirit*. This ambiguity is purposeful, as the German word Geist can mean mind in the psychological sense, or spirit, such as in the spirit of the times (Zeitgeist) that was introduced in Chapter 1. In anticipation of areas like social psychology and sociobiology, for Hegel, the individual minds of the members of a team and the shared collective consciousness that makes up their "team spirit" are closely related phenomena.

Hegel's Influence

Because Hegel's philosophy meant to show the interconnectedness of everything in the universe, it did much to stimulate the study of art, religion, history, and science. Russell (1945) commented on Hegel's widespread popularity: "At the end of the nineteenth century, the leading academic philosophers, both in America and Great Britain, were largely Hegelians. Outside of pure philosophy, many Protestant theologians adopted his doctrines, and his philosophy of history profoundly affected political theory" (p. 730). Perhaps the two most heralded influences are Karl Marx (1818–1883) and evolutionary theory.

We also find Hegel's influences in numerous places within psychology. As we will see in Chapter 8, Hegel strongly influenced Fechner and thereby the development of both psychophysics and the birth of experimental psychology. The phenomenological tradition inherent in many of the early German psychologists (Chapter 9), and which ultimately manifested itself in Gestalt psychology (Chapter 14), is indebted to Hegel. Freud's early consideration of the human will was explicitly Hegelian, and some see Freud's concepts of the id, ego, and superego (Chapter 16) as a manifestation of the dialectic process (Robinson, 1982). Both the romantics and the existentialists that we will consider in Chapter 7 to a large extent formed their philosophies in opposition to Hegel. And, the roots of self-actualization theory (as seen in Rogers and Maslow; Chapter 17) are found in Hegel's philosophy as well as those opposing romantics and existentialists.

The concept of *alienation*, or self-estrangement, also plays a central role in Hegel's philosophy. By *alienation*, Hegel meant the mind's realization that it exists apart from the Absolute, apart from that which it is striving to embrace. Insofar as the mind has not completed its journey toward the Absolute, it experiences alienation. (Marxists later adapted the term *alienation* to describe the separation of people from their government or from the fruits of their labor.) Variations on Hegel's concept of alienation are to be seen later in the clinical theories of Erich Fromm and Carl Rogers. Fromm used the term *alienation* to describe the separation of humans from their basic roots in nature, and he claimed that a major human motive was to reestablish a sense of "rootedness," or belonging. Rogers used the term *alienation* to describe the separation of the self from the biologically based urge toward self-actualization.

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Georg Wilhelm Friedrich Hegel

JOHANN FRIEDRICH HERBART

Johann Friedrich Herbart (1776–1841) was born in Oldenburg, Germany. As a result of an accident during infancy, he was a frail child and did not attend school until he was 12; instead, he was tutored by his mother. He was a precocious child who developed an early interest in logic. At 12 years of age, he began attending the Oldenburg *Gymnasium* (high school) where, at age 16, Kant's philosophy impressed him deeply. At the age of 18, he entered the University of Jena, where he pursued his interest in Kant. After three years at Jena, he left and became a private tutor in Switzerland. It was his experience with tutoring that created in Herbart a lifelong interest in education. In fact, before leaving Switzerland, Herbart consulted with the famous Swiss educational reformer J. H. Pestalozzi (1746–1827). After two years as a tutor, at the age of 23, Herbart moved to the city of Bremen, where he studied philosophical and educational issues for the next three years. In 1802, he moved to the University of Göttingen, where he obtained his doctorate and then remained as a *dozent* (instructor) until 1809. Although originally attracted to Kant's philosophy, Herbart criticized Kant in his doctoral dissertation and began developing his own philosophy, which was more compatible with Leibniz's thinking.

As testimony to his success, Herbart was invited to the University of Konigsberg in 1809 to occupy the position previously held by Kant. Herbart was only 33 at the time, and he remained at Konigsberg for 24 years, after which he returned to the University of Göttingen because the Prussian government had shown antagonism toward his educational research. He remained at Göttingen until his death eight years later in 1841.

Herbart's two most important books for psychology were his short *Textbook in Psychology* (1816) and his longer *Psychology as a Science Based on Experience, Metaphysics, and Mathematics* (1824–1825). The first—*Textbook in Psychology*—is heralded as a signal event. Although there are older books on psychology, these volumes were considering the subject as an aspect of either philosophy or physiology. Herbart's volume appears to be the first textbook in which psychology is treated as an independent academic discipline.

Psychology as Science

Herbart agreed in part with Kant's contention that psychology could never be an *experimental* science, but he believed that the activities of the mind could be expressed mathematically; in that sense, psychology could be a science. The reason Herbart denied that psychology could become an experimental science was that he believed experimentation necessitated dividing up its subject matter; and because the mind acted as an integrated whole, the mind could not be fractionated. For this reason, Herbart was very much opposed to faculty psychology, which was so popular in his day. He was also opposed to physiological psychology for the same reason; that is, he believed it fractionated the mind. After discussing his major ideas, we will examine more closely Herbart's attempt to mathematize psychology.

Psychic Mechanics. Herbart borrowed his concept of idea from the empiricists. That is, he viewed ideas as the remnants of sense impressions. Following Leibniz, however, he assumed that ideas (like monads) contained a force or energy of their own, and the laws of association were therefore not necessary to bind them. Herbart's system has been referred to as **psychic mechanics** because he believed that ideas had the power to either attract or repel other ideas, depending on their compatibility. Ideas tend to attract similar or compatible ideas, thus forming complex ideas. Similarly, ideas expend energy repelling dissimilar or incompatible ideas, thus attempting to avoid conflict. According to Herbart, all ideas struggle to gain expression in consciousness, and they compete with each other to do so. In Herbart's view, an idea is never destroyed or completely forgotten; either it is experienced consciously or it is not. Thus, the same idea may at one time be given conscious expression and at another time be unconscious.

Although ideas can never be completely destroyed, they can vary in intensity, or force. For Herbart, intense ideas are clear ideas, and all ideas attempt to become as clear as possible. Ideas in consciousness are bright and clear; unconscious ideas are darker and more obscure. Herbart used the term *self-preservation* to describe an idea's tendency to seek and maintain conscious expression. That is, each idea strives to preserve itself as intense, clear, and conscious. This tendency toward self-preservation naturally brings each idea into conflict with other, dissimilar ideas that are also seeking conscious expression. Thus, Herbart viewed the mind as a battleground where ideas struggle with each other to gain conscious expression. When an idea loses its battle with other ideas, rather than being destroyed, it momentarily loses some of its intensity (clarity) and sinks into the unconscious.

Herbart's position represented a major departure from that of the empiricists because the empiricists believed that ideas, like Newton's particles of matter, were passively buffeted around by forces external to them—for example, by the laws of association. Herbart agreed with the empiricists that ideas were derived from experience, but he maintained that once they existed they had a life of their own. For Herbart, an idea was like an atom with energy and a consciousness of its own—a conception very much like Leibniz's monads.

The Apperceptive Mass

Not only was Herbart's view of the idea very close to Leibniz's view of the monad, but Herbart also

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Johann Friedrich Herbart

borrowed the concept of apperception from Leibniz. According to Herbart, at any given moment, compatible ideas gather in consciousness and form a group. This group of compatible ideas constitutes the **apperceptive mass**. Another way of looking at the apperceptive mass is to equate it with attention; that is, the apperceptive mass contains all ideas to which we are currently attending.

It is with regard to the apperceptive mass that ideas compete with each other. An idea outside the apperceptive mass (that is, an idea of which we are not conscious) will be allowed to enter the apperceptive mass only if it is compatible with the other ideas contained there at the moment. If the idea is not compatible, the ideas in the apperceptive mass will mobilize their energy to prevent the idea from entering. Thus, whether an idea is a new one derived from experience or one already existing in the unconscious, it will be permitted conscious expression only if it is compatible with the ideas in the apperceptive mass.

Herbart used the term *repression* to describe the force used to hold ideas incompatible with the apperceptive mass in the unconscious. He also said that if enough similar ideas are repressed into the unconscious, they could combine their energy and force their way into consciousness, thereby displacing the existing apperceptive mass. Repressed ideas continue to exist intact and wait for an opportunity to be part of consciousness. They must wait either for a more compatible apperceptive mass to emerge or for the time that they can join forces with similar repressed ideas and force their way into consciousness, thereby creating a new apperceptive mass.

Herbart used the term *limen* (threshold) to describe the border between the conscious and the unconscious mind. It was Herbart's goal to mathematically express the relationships among the apperceptive mass, the limen, and the conflict among ideas. Herbart's mathematics came from the two individuals who probably influenced him the most, Leibniz and Newton. In fact, one of Herbart's primary goals was to describe the mind in mathematical terms just as Newton had described the physical world. Herbart's use of calculus to quantify complex mental phenomena made him one of the first to apply a mathematical model to psychology. Although the details are beyond the scope of this book, the interested reader can see how Herbart applied mathematics to his study of the mind by consulting Herbart's *Psychology as a Science* (1824–1825), Boring (1950), Boudewijnse, Murray, and Bandomir (1999, 2001), or Wolman (1968b).

Educational Psychology

Besides considering Herbart as one of the first mathematical psychologists, many consider him to be the first educational psychologist. He applied his theory to education by offering the following advice to teachers:

1. Review the material that has already been learned.
2. Prepare the student for new material by giving an overview of what is coming next. This creates a receptive apperceptive mass.
3. Present the new material.
4. Relate the new material to what has already been learned.
5. Show applications of the new material and give an overview of what is to be learned next.

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For Herbart, a student's existing apperceptive mass, or mental set, must be taken into consideration when presenting new material. Material not compatible with a student's apperceptive mass will likely not be understood. Herbart said, "The educator who demands that a student attend [to material] without relevant preparation … beforehand is playing on a musical instrument that has some of its strings missing" (1812/1888, p. 150). Herbart's theory of education comes very close to the more modern theory of Jean Piaget. Piaget said that for teaching to be effective, it must start with what a student can assimilate into his or her cognitive structure. If information is incompatible with a student's cognitive structure, it simply cannot be learned. If we substitute the term *apperceptive mass* for *cognitive structure*, we see a great deal of similarity between the theories of Herbart and Piaget (Chapter 19).

Herbart's Legacy

Herbart influenced the emergence of psychology in multiple ways. First, his insistence that psychology could at least be a mathematical science gave psychology more status and respectability than it had received from Kant. Despite Herbart's denial that psychology could be an experimental science, his efforts to quantify mental phenomena actually encouraged the development of experimental psychology.

Second, Herbart's (and Leibniz's) concept of limen was crucial to Gustav Fechner (see Chapter 8), whose psychophysics was instrumental in the development of psychology as a true science. Likewise, Herbart influenced Wilhelm Wundt, the founder of psychology as a separate scientific discipline. For example, Wundt relied heavily on Herbart's adaptation of Leibniz's concept of apprehension. In Chapter 9, we will examine Herbart's influence on Wundt more fully.

Herbart's concepts of the unconscious, repression, conflict, and his belief that ideas continue to exist intact even when we are not conscious of them found their way into Freud's psychoanalytic theory. Also finding its way into Freudian theory was Herbart's notion that unconscious ideas seeking conscious expression will be met with *resistance* if they are incompatible with ideas already in consciousness.

In 1844, a one-time student of Fechner, Rudolph Hermann Lotze (1817–1881), took over Herbart's chair at Göttingen, which he went on to hold for 35 years. In turn, it became a position held by the experimental *psychologist* G. E. Müller. Lotze himself is reminiscent of David Hartley, discussed in Chapter 5. Like Hartley, he combined the best physiology of the day (he was trained in medicine) with the questions of philosophy raised by Leibniz, Kant, Hegel, and Herbart, as seen in his major book—*Medical Psychology or the Physiology of the Soul.*

With Herbart and Lotze, we conclude the coverage of the rationalists of the 17th, 18th, and 19th centuries. Like Bain (and his journal *Mind*) with empiricism, in Herbart (and his textbook), we reach the transition between rationalism as a philosophy and psychology as a science. These thinkers perpetuated the tradition of Plato and Descartes, a tradition that is still very much alive in psychology. All theories that postulate the mind's active involvement in intelligence, perception, memory, personality, creativity, or cognition in general have their origins in the rationalist tradition. In fact, insofar as modern psychology is scientific, it is partially a rational enterprise. As mentioned in Chapter 1, scientific theory is a combination of empiricism and rationalism.

SUMMARY

British empiricism emphasized sensory experience and the laws of association in explaining the intellect, and a relatively passive mind. The rationalists, on the other hand, besides accepting the importance of sensory information, postulated an active mind that not only transformed information furnished by the senses, thus making it more meaningful, but also could discover and understand principles and concepts not contained in sensory information.

For Spinoza, there was only one basic reality (God), and it was both material and conscious; everything in the universe possessed these two aspects, including humans. A human was therefore seen as a material object from which consciousness (mind) could not be separated. This proposed relationship between mind and body was called psychophysical double aspectism, or simply double aspectism. Spinoza offered an entirely deterministic account of human thoughts, actions, and emotions and helped pave the way for the development of a science of psychology. Unlike Spinoza, Malebranche believed that there was a mind and a body, but that they did not interact. Rather, God coordinated them. That is, if there was an idea in the mind, God was aware of it and caused the body to act appropriately. Such a belief became known as occasionalism.

Leibniz emphatically disagreed with Locke that all ideas come from sensory experience, saying instead that the mind innately contains the potential to have ideas and that that potential is actualized by sensory experience. Leibniz suggested that the universe is made up of indivisible entities called monads. All monads possess some degree of consciousness. For Leibniz, the difference between a conscious and an unconscious experience depends on the number of monads involved. Like Spinoza, Leibniz believed that all matter possesses consciousness but that physical bodies vary in their ability to think clearly. Leibniz's contention that the monads of the mind were perfectly correlated with those of the body was called preestablished harmony, and was his answer to the mind–body problem.

Reid was strongly opposed to Hume's skepticism. He thought that we could accept the physical world as it appears to us because it makes common sense to do so. Reid's contention that reality is as we experience it is called direct realism, or naive realism. Reid postulated powers of the mind or mental faculties to account for various conscious phenomena.

Kant agreed with Hume that any conclusions we reach about physical reality are based on subjective experience. However, Kant asked where concepts such as cause and effect come from if we never directly experience causal relationships. His answer was that several categories of thought are innate and that sensory information is modified by those categories. What we experience consciously is determined by the combined influences of sensory information and the innate categories of thought. Because our experiences of such things as totality, causality, time, and space are not found in sensory experience, they must be imposed on such experience by the mind. The categorical imperative is an innate moral principle, but people can choose whether or not to act in accordance with it; those who choose to do so act morally, and those who do not act immorally. According to Kant's categorical imperative, the maxims governing one's behavior should be such that they could form the basis of a universal moral law. Kant did not believe that psychology could be a science because he believed that subjective experience could not be measured with mathematical precision. He did believe that human behavior could be beneficially studied, however, and he called such study anthropology.

Like Spinoza, Hegel believed the universe to be an interrelated unity. For Hegel, the only true knowledge was that of unity, which he called the Absolute. Hegel believed that the human intellect advanced by the dialectic process, which for him involved a thesis (an idea) interacting with its antithesis (the opposite of that idea) to produce a synthesis (the result of the interaction). The synthesis then becomes the thesis of the next stage of development. As this process continues, humans approximate an understanding of the Absolute.

Herbart disagreed with the empiricists, who likened an idea to a Newtonian particle whose fate was determined by forces external to it. Rather, Herbart likened an idea to a Leibnizian monad; that is, he saw ideas as having an energy of their own. Also, he saw ideas as striving for conscious expression. The group of compatible ideas of which we are conscious at any given moment forms the apperceptive mass; all other ideas are in the unconscious. It is possible for an idea to cross the threshold between the unconscious and the conscious mind if that idea is compatible with the ideas making up the apperceptive mass. He is also considered to be the first educational psychologist.

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DISCUSSION QUESTIONS

1. In general, what are the basic differences between empiricism and rationalism? Include in your answer a distinction between a passive and an active mind.
2. Assume a person robs a bank. Give the general tenor of an explanation of that person's behavior based on reasons and then on causes. In which type of explanation would holding the person responsible for his or her actions make the most sense? Explain.
3. What was Spinoza's conception of nature? What was his position on the mind–body relationship?
4. How did Spinoza distinguish between emotions and passions? Give an example of each.
5. In what way did Spinoza's philosophy encourage the development of scientific psychology?
6. What was Malebranche's position on the mind–body relationship?
7. Leibniz disagreed with Locke's contention that all ideas are derived from experience. How did Leibniz explain the origin of ideas?
8. Summarize Leibniz's monadology.
9. Discuss Leibniz's proposed solution to the mind–body problem.
10. Describe the relationship among petites perceptions, limen, and apperception.
11. Summarize Reid's philosophy of common sense. Include in your answer a definition of direct realism.
12. What is faculty psychology?
13. What did Kant mean by an a priori category of thought? According to Kant, how do such categories influence what we experience consciously?
14. Briefly summarize Kant's explanation of the experiences of causality, time, and space.
15. Discuss the importance of the categorical imperative in Kant's philosophy.
16. Did Kant believe that psychology could become a science? Why or why not?
17. Discuss Hegel's notion of the Absolute. Describe the dialectic process by which Hegel felt the Absolute was approximated.
18. Discuss Herbart's notion of the apperceptive mass. For example, how does the apperceptive mass determine which ideas are experienced consciously and which are not? Include in your answer the concept of the limen, or threshold.
19. How did Herbart apply his theory to educational practices?
20. Discuss Herbart as a transitional figure between philosophy and psychology.

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GLOSSARY

Absolute, The According to Hegel, the totality of the universe. A knowledge of the Absolute constitutes the only true knowledge, and separate aspects of the universe can be understood only in terms of their relationship to the Absolute. Through the dialectic process, human history and the human intellect progress toward the Absolute.

Active mind A mind equipped with categories or operations that are used to analyze, organize, or modify sensory information and to discover abstract concepts or principles not contained within sensory experience. The rationalists postulated such a mind.

Anthropology Kant's proposed study of human behavior. Such a study could yield practical information that could be used to predict and control behavior.

Apperception Conscious experience.

Apperceptive mass According to Herbart, the cluster of interrelated ideas of which we are conscious at any given moment.

Categorical imperative According to Kant, the moral directive that we should always act in such a way that the maxims governing our moral decisions could be used as a guide for everyone else's moral behavior.

Categories of thought Those innate attributes of the mind that Kant postulated to explain subjective experiences we have that cannot be explained in terms of sensory experience alone—for example, the experiences of time, causality, and space.

Commonsense philosophy The position, first proposed by Reid, that we can assume the existence of the physical world and of human reasoning powers because it makes common sense to do so.

Dialectic process According to Hegel, the process involving an original idea, the negation of the original idea, and a synthesis of the original idea and its negation. The synthesis then becomes the starting point (the idea) of the next cycle of the developmental process.

Direct realism The belief that sensory experience represents physical reality exactly as it is. Also called naive realism.

Double aspectism Spinoza's contention that material substance and consciousness are two inseparable aspects of everything in the universe, including humans. Also called psychophysical double aspectism and double-aspect monism.

Faculty psychology The belief that the mind consists of several powers or faculties.

Hegel, Georg Wilhelm Friedrich (1770–1831) Like Spinoza, believed the universe to be an interrelated unity. Hegel called this unity the Absolute, and he thought that human history and the human intellect progress via the dialectic process toward the Absolute. (*See also* **The Absolute**.)

Herbart, Johann Friedrich (1776–1841) Likened ideas to Leibniz's monads by saying that they had energy and a consciousness of their own. Also, according to Herbart, ideas strive for consciousness. Those ideas compatible with a person's apperceptive mass are given conscious expression, whereas those that are not remain below the limen in the unconscious mind. Herbart is considered to be one of the first mathematical and educational psychologists.

Kant, Immanuel (1724–1804) Believed that experiences such as those of unity, causation, time, and space could not be derived from sensory experience and therefore must be attributable to innate categories of thought. He also believed that morality is, or should be, governed by the categorical imperative. He did not believe psychology could become a science because subjective experience could not be quantified mathematically.

Law of continuity Leibniz's contention that there are no major gaps or leaps in nature. Rather, all differences in nature are characterized by small gradations.

Leibniz, Gottfried Wilhelm von (1646–1716) Believed that the universe consists of indivisible units called monads. God had created the arrangement of the monads, and therefore this was the best of all possible worlds. If only a few minute monads were experienced, petites perceptions resulted, which were unconscious. If enough minute monads were experienced at the same time, apperception occurred, which was a conscious experience. (*See also* **Petites perceptions**.)

Limen For Leibniz and Herbart, the border between the conscious and the unconscious mind. Also called threshold.

Malebranche, Nicolas de (1638–1715) Contended that the mind and body were separate but that God coordinated their activities.

Monads According to Leibniz, the indivisible units that compose everything in the universe. All monads are characterized by consciousness, but some more so than others. Inert matter possesses only dim consciousness, and then with increased ability to think clearly come plants, animals, humans, and, finally, God. The goal of each monad is to think as clearly as it is capable of doing. Because humans share monads with matter, plants, and animals, sometimes our thoughts are less than clear.

Occasionalism The belief that bodily events and mental events are coordinated by God's intervention.

Pantheism The belief that God is present everywhere and in everything.

Passive mind A mind whose contents are determined by sensory experience. It contains a few mechanistic principles that organize, store, and generalize sensory experiences. The British empiricists and the French sensationalists tended to postulate such a mind.

Petites perceptions According to Leibniz, a perception that occurs below the level of awareness because only a few monads are involved.

Preestablished harmony Leibniz's contention that God had created the monads composing the universe in such a way that a continuous harmony existed among them. This explained why mental and bodily events were coordinated.

Psychic mechanics The term used by Herbart to describe how ideas struggle with each other to gain conscious expression.

Psychophysical parallelism The contention that bodily and mental events are correlated but that there is no interaction between them.

Rationalism The philosophical position postulating an active mind that transforms sensory information and is capable of understanding abstract principles or concepts not attainable from sensory information alone.

Reid, Thomas (1710–1796) Believed that we could trust our sensory impressions to accurately reflect physical reality because it makes common sense to do so. Reid attributed several rational faculties to the mind and was therefore a faculty psychologist.

Spinoza, Baruch (1632–1677) Equated God with nature and said that everything in nature, including humans, consisted of both matter and consciousness. Spinoza's proposed solution to the mind–body problem is called double aspectism. The most pleasurable life, according to Spinoza, is one lived in accordance with the laws of nature. Emotional experience is desirable because it is controlled by reason; passionate experience is undesirable because it is not. Spinoza's deterministic view of human cognition, activity, and emotion did much to facilitate the development of scientific psychology.

7

Romanticism and Existentialism

Starting with the Renaissance humanists (see Chapter 4), the authority of the church began to be questioned and a period of more objective inquiry concerning the world and humans ensued. The work of such individuals as Copernicus, Kepler, Galileo, Hobbes, Newton, Bacon, and Descartes ushered in the period in philosophy referred to as the **Enlightenment**. The term *enlightenment* was used to contrast the period with the "darkness" of irrationality and superstition that was thought to characterize the previous age. Increasing skepticism concerning religious dogma and the Enlightenment were closely related: "Serious concerns about the historical accuracy of the Bible began to appear during the Enlightenment, when supernatural doctrines of divine revelation that guaranteed the truth of Scripture became matters of scholarly debate" (Ehrman, 2003, p. 168). For Enlightenment thinkers, who tended to be either deists or outright atheists, "beliefs are to be accepted only on the basis of reason, not on the authority of priests, sacred texts, or tradition" (Inwood, 1995, p. 236). Furthermore, knowledge was power. Knowledge meant understanding the abstract principles governing the universe, and power came from applying that knowledge to improve society. During the Enlightenment it was widely believed that societal perfection was achievable through the application of objective (for example, scientific) knowledge and, therefore, the period was characterized by considerable optimism.

Clearly, for the Enlightenment thinkers, the most important human attribute was rationality. Individual differences among humans were viewed as less important than their shared rationality:

> The Enlightenment devalues prejudices and customs, which owe their development to historical peculiarities rather than to the exercise

> of reason. What matters to the Enlightenment is not whether one is French or German, but that one is an individual man, united in brotherhood with all other men by the rationality one shares with them. (Inwood, 1995, p. 236)

Also, Enlightenment thinkers devalued the irrational aspects of human nature, such as the emotions. It is no wonder that the Enlightenment is often referred to as the Age of Reason.

It is not clear exactly when the Enlightenment began; it is even less clear when it ended, if it ever did. In any case, Enlightenment ideals were embraced by the British empiricists (especially by Hobbes, Locke, and J. S. Mill), the French sensationalists, and the positivists (see Chapter 5). Enlightenment epistemology glorified sensory experiences and rationality, the two primary components of science. In fact, as was noted in Chapter 5, the British and French empiricists attempted to apply Newtonian science to an understanding of human nature. That is, they attempted to explain human nature objectively in terms of a few basic principles.

Although the philosophies of Hume (see Chapter 5) and Kant (see Chapter 6) shared many of the ideals of the Enlightenment, their philosophies did much to show the limitations of human rationality. For example, Hume and Kant demonstrated that physical reality could never be experienced directly and therefore could never be known. Other philosophers began to view the search for the universal, abstract principles governing human behavior as not only cold and impersonal, but also misleading. Human behavior, they said, is not governed by universal, abstract principles but by personal experience and individual perspectives. By denying universal truths and insisting instead on many individual truths, these philosophers had much in common with the ancient Sophists (see Chapter 2) and Skeptics (see Chapter 3). Two of the most influential criticisms of Enlightenment philosophy were romanticism and existentialism, and those philosophies are the focus of this chapter.

ROMANTICISM

Some philosophers began to argue that humans consist of more than an intellect and ideas derived from experience. Humans, they said, also possess a wide variety of irrational feelings (emotions), intuitions, and instincts. Those philosophers emphasizing the importance of these irrational components of human nature were called romantics. They believed that rational thought had often led humans astray in their search for valid information and that empiricism reduced people to unfeeling machines. According to the romantics, the best way to find out what humans are really like is to study the *total* person, not just his or her rational powers or empirically determined ideas. For the romantic, "a return to the lived world and to childlike openness was needed" (Schneider, 1998, p. 278). As mentioned in Chapter 5, aspects of romanticism were found in ancient Cynicism and in Renaissance humanism.

Of course, the empiricists and sensationalists did not totally neglect human emotionality. Their coverage of the topic, however, was either minimal or secondary to other concerns. The empiricists and sensationalists generally believed that all human emotions were derived from the feelings of pleasure and pain. They also generally believed that emotions become associated with various sensations and ideas by the same mechanical laws of association that bind ideas together. Neither did the rationalists neglect the topic of human emotions. Spinoza, for example, shared the belief that most, if not all, human emotions are derived from the feelings of pleasure or pain. In addition, Spinoza, like many other rationalists, believed that emotional experience is often destructive if not controlled by rational processes. The romantics sought to elevate

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Jean-Jacques Rousseau

human emotions, intuitions, and instincts from the inferior philosophical position they had occupied to one of being the primary guides for human conduct.

The rational, empirical, and positivistic philosophers (that is, the philosophers of the Enlightenment) had attempted to create political and moral systems based on their philosophies. According to the romantics, these efforts had failed because they viewed humans mainly as either victims of experience or vehicles by which some grandiose, rational principle was manifested (such as in Hegel). During the romantic movement, in the late 18th to mid-19th century, the good life was defined as one lived honestly in accordance with one's inner nature. The great philosophical systems were no longer to be trusted; in general, science was also seen as antithetical—or at best irrelevant—to understanding humans. Rousseau is usually thought of as the father of **romanticism**, and it is to his philosophy that we turn next.

Jean-Jacques Rousseau

Jean-Jacques Rousseau (1712–1778) was born in Geneva, the son of a watchmaker, and raised a Calvinist. His mother died soon after giving birth to him—for which his father never forgave him. In fact, Rousseau's father abandoned him when he was 10 years old, and he was brought up by relatives. Suffering from poor health all his life, Rousseau left school at the age of 12 and moved from place to place and from job to job. Once, he was so hungry that he converted to Catholicism in order to receive free food and lodging in a Catholic church. He said of this act, "I could not dissemble from myself that the holy deed I was about to do was at bottom the act of a bandit" (Russell, 1945, p. 685).

As a young adolescent, Rousseau was filled with sexual desire but didn't know what to do about it: "My heated blood incessantly filled my brain with girls and women; but, ignorant of the relations of sex, I made use of them in my imagination in accordance with my distorted notions" (1781/1996, p. 84). For example, young Rousseau sought sexual satisfaction through exhibitionism: "I haunted dark alleys and hidden retreats, where I might be able to expose myself to women in the condition in which I should liked to have been in their company" (1781/1996, p. 84). On one such occasion, Rousseau was caught, but lied his way out of trouble. He told the man who caught him that he was of good birth but suffered a brain affliction for which his family was about to confine him. He had run away, Rousseau continued, in an effort to escape this confinement. So, he told the man, his actions were of a desperate young man and should not be judged too harshly. Much to his amazement, Rousseau was released after only a brief reprimand.

When Rousseau was 15, he met Madame de Warens, a Swiss baroness who was 28 and had converted to Catholicism. Madame de Warens was well educated in religion, literature, and philosophy, and for 10 years she was Rousseau's lover and tutor. Following his relationship with Madame de Warens, Rousseau spent several years as a vagabond, making money any way he could—sometimes illegally or by deception. In 1745 Rousseau began a relationship with Thérèse Le Vasseur, a maid in his hotel in Paris. He lived with her (and her mother) the rest of his life, and they had five children, all of whom were sent to a foundling home (an orphanage). Rousseau had been a

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womanizer and remained one during his relationship with Thérèse. Understanding why he chose this person to share his life is difficult. She was uneducated and relatively unattractive. When they first met, she could neither read nor write and did not know the names of the months. Rousseau eventually did teach her to write but not to read. Later in their relationship, Thérèse took to drinking and running after stable boys. Russell (1945) speculates that Rousseau maintained his relationship with Thérèse because she made him feel intellectually and financially superior.

Arriving in Paris at the age of 30, Rousseau joined a group of influential Parisian intellectuals, although he himself had had no formal education. Rousseau was an intensely private person and did not like the social life of the city. In 1756 he left Paris for the quiet of the country, but the 1762 publication of his two most famous works, *The Social Contract* and *Emile*, ended Rousseau's tranquil country life. Within a month of the publication of these books, the city of Paris condemned them, and Rousseau's hometown of Geneva issued a warrant for his arrest. He was forced to spend the next four years as a refugee. Finally, in 1765 David Hume offered Rousseau safe haven in England. Eventually, opposition to Rousseau's ideas faded and Rousseau returned to Paris, where he remained until his death. He died in poverty, and suicide was suspected (Russell, 1945).

Feelings Versus Reason. Rousseau began *The Social Contract* with this statement: "Man is born free and yet we see him everywhere in chains" (1762/1947, p. 5). His point was that all governments in Europe at the time were based on a faulty assumption about human nature—the assumption that humans need to be governed. The only justifiable government, according to Rousseau, was one that allowed humans to reach their full potential and to fully express their free will. The best guide for human conduct is a person's honest feelings and inclinations: "Let us lay it down as an incontrovertible rule that the first impulses of [human] nature are always right; there is no original sin in the human heart" (Rousseau, 1762/1974, p. 56). In his idealization of untouched human nature, Rousseau had much in common with the ancient Cynics (see Chapter 3). In fact, his contemporaries called him "a new Diogenes" (Niehues-Pröbsting, 1996). Rousseau distrusted reason, organized religion, science, and societal laws as guides for human conduct. His philosophy became a defense for Protestantism because it supported the notion that God's existence could be defended on the basis of individual feeling and did not depend on the dictates of the church.

In Chapter 17, we will see that Rousseau's trust of inner feelings as guides for action was shared by the humanist psychologist Carl Rogers.

The Noble Savage. Looking at natural impulses to understand humans was not new with Rousseau; we saw in Chapter 5 that Hobbes did the same thing. The major difference between Hobbes and Rousseau is in the conclusions they reached about human nature. For Hobbes, human nature was animalistic and selfish and needed to be controlled by government. This view of human nature was also accepted by many theologians and philosophers, who said that reason had to be almost constantly employed to control brutish human impulses. Rousseau completely disagreed, saying instead that humans were born basically good. He reversed the doctrine of original sin by insisting that humans are born good but are made bad by societal institutions.

Rousseau claimed that if a **noble savage** could be found (a human not contaminated by society), we would have a human whose behavior was governed by feelings but who would not be selfish. Rousseau believed that humans were, by nature, social animals who wished to live in harmony with other humans. If humans were permitted to develop freely, they would become happy, fulfilled, free, and socially minded. They would do what is best for themselves and for others if simply given the freedom to do so.

The General Will. Even though the conceptions of human nature accepted by Hobbes and Rousseau were essentially opposite, the type of government that the two proposed was quite similar.

Rousseau conceded that to live in civilized societies, humans had to give up some of their primitive independence. The question that he pondered in his *Social Contract* is how humans could be governed and still remain as free as possible. It is in answer to this question that Rousseau introduced his notion of the general will. According to Rousseau, the **general will** describes what is best within a community, and it is to be "sharply distinguished" from an individual's will or even a unanimous agreement among individuals:

> This general will is to be kept sharply distinguished from what the members of a society may, by majority vote or even by unanimous agreement, decide is their good. Such a decision, which Rousseau distinguished from the general will by calling it "the will of all," may be wrong. The general will, by definition, cannot be wrong because it is the very standard of right. (Frankel, 1947, p. xxiv)

Each individual has both a tendency to be selfish (private will) and a tendency to act in ways beneficial to the community (general will). To live in harmony with others, each person is obliged to act in accordance with his or her general will and inhibit his or her private will.

The "social contract," then, can be summarized as follows: "Each of us places in common his person and all of his power under the supreme direction of the general will; and as one body we all receive each member as an indivisible part of the whole" (Rousseau, 1762/1947, p. 15). In Rousseau's "utopia," if a person's private will is contrary to the general will, he or she can be forced to follow the general will. Also, there are no elections and no private property: "The state, in relation to its members, is master of all their wealth" (Rousseau, 1762/1947, p. 20). The governments that Rousseau encouraged were anything but democratic.

Education. Rousseau began *Emile* (1762/1974) the same way that he began *The Social Contract*, that is, by condemning society for interfering with nature and with natural human impulses:

> God makes all things good; man meddles with them and they become evil. He forces one soil to yield the products of another, one tree to bear another's fruit. He confuses and confounds time, place, and natural conditions. He mutilates his dog, his horse, and his slave. He destroys and defaces all things; he loves all that is deformed and monstrous; he will have nothing as nature made it, not even man himself, who must learn his paces like a saddlehorse, and be shaped to his master's taste like the trees in his garden. (p. 5)

According to Rousseau, education should take advantage of natural impulses rather than distort them. Education should not consist of pouring information into children in a highly structured school. Rather, education should create a situation in which a child's natural abilities and interests can be nurtured. For Rousseau, the child naturally has a rich array of positive instincts, and the best education is one that allows these impulses to become actualized.

In *Emile* (1762/1974), a treatise on education in the form of a novel, Rousseau described what he considered the optimal setting for education. A child and his tutor leave civilization and return to nature; in this setting, the child is free to follow his own talents and curiosities. The tutor responds to the child's questions rather than trying to impose his views on the child. As the child matures, his abilities and interests change, and thus what constitutes a meaningful educational experience changes. It is always the child's natural abilities and interests, however, that guide the educational process. Rousseau (1762/1974) described how education should be responsive to each particular student's interests and abilities:

> Every mind has its own form, in accordance with which it must be controlled; and the success of the pains taken depends largely on the fact that he is controlled in this way and no other. Oh, wise man, take time to observe nature; watch your scholar well before you say a word to him; first leave the

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> germ of his character free to show itself, do not constrain him in anything, the better to see him as he really is…. The wise physician does not hastily give prescriptions at first sight, but he studies the constitution of the sick man before he prescribes anything; the treatment is begun later, but the patient is cured, while the hasty doctor kills him. (p. 58)

As previously noted, in modern times the humanistic psychologist Carl Rogers (see Chapter 17) expressed a philosophy of education very similar to that of Rousseau.

Johann Wolfgang von Goethe

The poet, dramatist, scientist, and philosopher **Johann Wolfgang von Goethe (1749–1832)** was one of the most revered individuals in the intellectual life of Germany in the late 18th and early 19th centuries. Goethe is usually thought of as the initiator of the *Sturm und Drang* (storm and stress) period in literature; in his literary works and philosophy, he viewed humans as being torn by the stresses and conflicts of life. He believed life consisted of opposing forces such as love and hate, life and death, and good and evil. The goal of life should be to embrace these forces rather than to deny them. One should live life with a passion and aspire continuously for personal growth. Even the darker aspects of human nature could provide stimulation for personal expansion. The idea of being transformed from one type of being (unfulfilled) into another type (fulfilled) was common within the romantic movement. We will see later that Nietzsche was strongly influenced by Goethe's philosophy of life.

In 1774, Goethe wrote *The Sorrows of Young Werther*, a novella about a young man with love problems. These problems were so vividly portrayed that several suicides were attributed to them (Hulse, 1989). In 1808 Goethe published Part I of his dramatic poem *Faust*; Part II was published posthumously in 1833 (Kaufmann, 1961, offers both parts under one cover). *Faust* is widely considered one of the greatest literary works of all time. As *Faust* begins, old Dr. Faust is filled with despair and is contemplating suicide. Satan appears and makes a deal with him: Satan could take Faust's soul if Faust had an experience he wished would continue eternally. With that bargain sealed, Satan transforms Faust from an old man into a wise and handsome youth. The young Faust then begins his search for a source of happiness so great that he would choose to experience it forever. Faust finally bids time to stand still when he encounters people allowed to express their individual freedom. He views human liberty as the ultimate source of happiness.

Although most of the romantics were antiscience, Goethe was not. He made important discoveries in anatomy and botany, and he wrote *Science of Colors* (1810), in which he attempted to refute Newton's theory of color vision and proposed his own theory in its place. Although Goethe's theory proved to be incorrect, his methodology had a major impact on later psychology. Goethe demonstrated that sensory experiences could be objectively studied by introspection. Furthermore, he insisted that intact, meaningful psychological experience should be the object of study rather than meaningless, isolated sensations. This insistence that whole, meaningful experiences be studied came to be called **phenomenology**. An example is the color-contrast effect known as Goethe's shadows. Goethe observed that when a colored light is shown on an object, the shadow produced appears to be complementary to the colored light (Gregory, 1987). This phenomenon was to be instrumental in the development of Edwin Land's theory of color vision (see Land, 1964, 1977). Many years before Darwin, Goethe also proposed a theory of evolution according to which one species of living thing could gradually be transformed into another. Goethe even employed a form of what is now called behavior therapy to alleviate a number of his own personal problems and those of a depressed theology student who came to Goethe for help (Bringmann, Voss, & Balance, 1997). Rather than denying the importance of science, Goethe saw science as limited; he believed that many important human attributes were beyond the grasp of the

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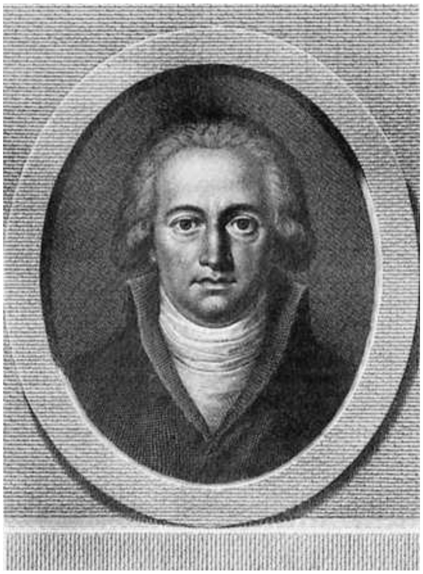
Courtesy of the National Library of Medicine

Johann Wolfgang von Goethe

scientific method. Goethe died on March 22, 1832, at the age of 82.

Goethe's Influence. D. N. Robinson (1982) nicely summarizes Goethe's influence as follows:

> To him … goes much of the credit for awakening scholars to the problem of *esthetics* and for infusing German philosophical writing with a conscientious regard for what is creative and dynamic in the human psyche. In the Goethean presence, every important philosophical production in the Germany of the nineteenth century would reserve a special place for art. Indeed, Romanticism itself is to be understood as the unique melding of esthetics and metaphysics. (p. 97)

Because of his significant influence on the entire German culture, Goethe has had many influences on the development of psychology. One famous psychologist whom Goethe's writings influenced directly was Carl Jung, a colleague of Freud.

> In my youth (around 1890) I was unconsciously caught up by this spirit of the age, and had no methods at hand of extricating myself from it. *Faust* struck a cord in me and pierced me through in a way that I could not but regard as personal. Most of all, it awakened in me the problems of opposites, of good and evil, of mind and matter, of light and darkness. (Jung, 1963, p. 235)

Goethe's writings also influenced Freud. Both Jung's and Freud's theories emphasize the conflicting forces operating in one's life, and both theories focus on conflict, frustration, and perpetual struggle between animal impulses and civilized behavior. Also, both Freud and Jung maintained that animalistic urges were not to be totally eliminated but instead harnessed and used to enhance personal growth. All these ideas appeared in Goethe's writings.

Arthur Schopenhauer

The important German philosopher **Arthur Schopenhauer (1788–1860)** was born in Danzig (now Gdansk, Poland). His father was a banker and his mother a famous novelist. After his father died in 1805 (probably by suicide), his mother, Johanna, established an artistic and intellectual salon that was frequented by many of the luminaries of the day, including Goethe. Arthur benefited considerably from his relationships with these individuals. However, his relationship with his mother became increasingly stormy, and in 1814 she threw him out of the house and never saw him again (Janaway, 1994). Schopenhauer was educated at the Universities of Göttingen and Berlin, becoming a teacher at the latter. While at Berlin, Schopenhauer tested his ability to attract students by scheduling his lectures at the same time as Hegel's; however, he was so unsuccessful at drawing away Hegel's students that he gave up lecturing. Schopenhauer claims that he was most influenced by Kant and by ancient philosophies from India and Persia, which he read nightly. The reading of ancient eastern philosophies was trendy in the early 1800s among European intellectuals, and his study displayed a bust of Kant and a bronze statue of Buddha.

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Arthur Schopenhauer

Schopenhauer never married, but he had a healthy sexual appetite. Most of his relationships were casual and involved prostitutes and servant girls, one of whom bore him a child (Magee, 1997). However, his affair with Caroline Richter, a chorus girl at the National Theatre of Berlin, lasted for 10 years. Their friendship continued for the remainder of Schopenhauer's life, and she was a beneficiary in his will.

Will to Survive. Schopenhauer published the two volumes of his most famous work, *The World as Will and Representation*, in 1818, when he was about 30. Schopenhauer believed that in this work he had unveiled the mysteries of the world, but nearly 17 years after its publication the book had still sold very few copies (Magee, 1997). Eventually, however, the book would come to be considered a masterpiece of Western philosophy.

Schopenhauer took Kant's philosophy as a basis for his own. Most importantly, he accepted Kant's distinction between the noumenal world (things in themselves) and the phenomenal world (conscious experience). Schopenhauer equated the noumenal world with "will," which he described as a blind, aimless force which cannot be known. In humans, this force manifests itself in the **will to survive**, which causes an unending cycle of needs and need satisfaction. For Schopenhauer, the powerful drive toward self-preservation—not the intellect and not morality—accounts for most human behavior. Most human behavior, then, is irrational. To satisfy our will to survive, we must eat, sleep, eliminate, drink, and engage in sexual activity. The pain caused by an unsatisfied need causes us to act to satisfy the need. When the need is satisfied, we experience momentary satisfaction (pleasure), which lasts only until another need arises, and on it goes. Schopenhauer's pessimism toward the human condition is clearly shown in the following quotation:

> All *willing* springs from lack, from deficiency, and thus from suffering. Fulfillment brings this to an end; yet for one wish that is fulfilled there remain at least ten that are denied.… No attained object of willing can give a satisfaction that lasts and no longer declines; but it is always like the alms thrown to a beggar, which reprieves him today so that his misery may be prolonged till tomorrow. Therefore, so long as our consciousness is filled by our will, so long as we are given up to the throng of desires with its constant hopes and fears, so long as we are the subject of willing, we never obtain lasting happiness or peace. (1818/1966, Vol. 1, p. 196)

Momentary pleasure is experienced when a need is satisfied, but when all needs are satisfied, we experience boredom. With Schopenhauer's characteristic pessimism, he said that we work six days a week to satisfy our needs and then we spend Sunday being bored (Viktor Frankl, Chapter 17, called this boredom Sunday neurosis).

Intelligent Beings Suffer the Most. Suffering varies with awareness. Plants suffer no pain because they lack awareness. The lowest species of animals and insects suffer some, and higher animals still more. Humans, of course, suffer the most, especially the most intelligent humans:

> Therefore, in proportion as knowledge attains to distinctness, consciousness is

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> enhanced, pain also increases, and consequently reaches its highest degree in man; and all the more, the more distinctly he knows, and the more intelligent he is. The person in whom genius is to be found suffers most of all. (1818/1966, Vol. 1, p. 310)

Schopenhauer quoted from the book of Ecclesiastes in the Bible to support his contention that intelligent people suffer more than unintelligent people: "In much wisdom there is much grief; and he that increaseth knowledge increaseth sorrow" (1851/1995a, p. 41). Schopenhauer believed that the suffering caused by wisdom had a nobility associated with it but that the life of a fool was simply without higher meaning. There is little doubt which sort of life Schopenhauer believed was most desirable.

According to Schopenhauer, highly intelligent people seek solitude, and vulgar (common) people are gregarious: "The more a man has in himself, the less others can be to him" (1851/1995b, p. 27). For the intellectually gifted, solitude has two advantages. First, it allows him or her to be alone with his or her own thoughts. Second, it prevents needing to deal with intellectually inferior people, and they, according to Schopenhauer, constitute the vast majority. "Almost all our sufferings," said Schopenhauer, "spring from having to do with other people" (1951/1995b, p. 30). On more than one occasion, Schopenhauer used the same phrase that Hobbes had used to describe the relationship among humans. That is, *homo homini lupus* (man is a wolf to man).

According to Schopenhauer (1818/1966), another way of viewing life is as the postponement of death. In this life-and-death struggle, however, death must always be the ultimate victor:

> The life of our body [is] only a constantly prevented dying, an ever-deferred death.… Every breath we draw wards off the death that constantly impinges on us. In this way, we struggle with it every second, and again at longer intervals through every meal we eat, every sleep we take, every time we warm ourselves, and so on. Ultimately death must triumph, for by birth it has already become our lot, and it plays with its prey only for a while before swallowing it up. However, we continue our life with great interest and much solicitude as long as possible, just as we blow out a soap-bubble as long and as large as possible, although with the perfect certainty that it will burst. (1818/1966, Vol. 1, p. 311)

According to Schopenhauer (1818/1966, Vol. 1, pp. 312–313), most people do not cling to life because it is pleasant. Rather, they cling to life because they fear death.

Sublimation and Denial. Even though these powerful, irrational forces are a natural part of human existence, humans can and should attempt to rise above them. With great effort, humans are capable of approaching nirvana, a state characterized by freedom from irrational strivings. Schopenhauer anticipated Freud's concept of sublimation when he said that some relief or escape from the irrational forces within us can be attained by immersing ourselves in activities that are not need-related and therefore cannot be frustrated or satiated, activities such as poetry, theatre, art, music, Platonic philosophy, or unselfish, nonsexual, sympathetic love. Also, one can attempt to counteract these irrational forces, especially the sex drive, by living a life of asceticism.

As we have seen, Schopenhauer believed that humans suffer more than other animals because our superior intellect allows us to detect the irrational urges within us. This same intellect, however, provides what little relief is possible from the need and need satisfaction cycle—that is, by pursuing intellectual activities, instead of biological ones. Or we can attack the will head on, depriving it of fulfillment as much as possible. Because, for Schopenhauer, will is the cause of everything, to deny it is to flirt with nothingness. Coming as close as possible to nonexistence is as close as one can get to not being totally controlled by one's will. The will must be served if life is to continue, but one can be a reluctant servant.

Although Schopenhauer was an atheist, he realized that his philosophy of denial had been part of several great religions; for example, Christianity, Hinduism, and Buddhism. In such religions, saints and mystics have been revered for living lives impervious to food, drink, bodily and mental comfort, sex, and worldly goods. In all cases, the aim of this denial is to grasp the illusory nature of the phenomenal world and to free the self from its bondage. Having done this, these saints and mystics come as close to experiencing the noumenal world as possible. What Schopenhauer calls the noumenal world (will), they often refer to as God. Schopenhauer considered his contribution to these transcendental matters to be a discussion of them within the context of philosophy and without appeal to religious faith or revelation.

In reading Schopenhauer, suicide as an escape from human misery comes to mind. Most individuals resist such an adjustment, however, because it is diametrically opposed to the will to survive. This is why, according to Schopenhauer, that a person suffering from a painful, terminal disease finds it very difficult to take his or her life, even when this might be the rational thing to do. Furthermore, Schopenhauer believed that a major goal for humans is to gain insight into their existence. For Schopenhauer, the essence of human existence was the relationship between the noumenal (the powerful, aimless will) and the phenomenal (consciousness). As we have seen, this relationship causes an unending cycle of need and need satisfaction. However, for Schopenhauer the proper adjustment to this tragic condition is to struggle to rise above it or, at least, to minimize it. Suicide evades this noble effort and is therefore, according to Schopenhauer, a mistake.

The Importance of the Unconscious Mind. Anticipating Freud, Schopenhauer observed that all humans have positive (intellectual, rational) and negative (animalistic) impulses:

> In an excellent parable, Proclus, the Neoplatonist, points out how in every town the mob dwells side by side with those who are rich and distinguished; so, too, in every man, be he never [sic] so noble, and dignified, there is in the depths of his nature, a mob of low and vulgar desires which constitute him an animal. It will not do to let this mob revolt or even so much a peep forth from its hiding-place. (1851/1995b, p. 43)

Elsewhere, Schopenhauer said, "Consciousness is the mere surface of our mind, and of this, as of the globe, we do not know the interior, but only the crust" (1818/1966, Vol. 2, p. 136).

Schopenhauer also spoke of repressing undesirable thoughts into the unconscious and of the resistance encountered when attempting to recognize repressed ideas. Freud credited Schopenhauer as being the first to discover these processes, but Freud claimed that he had discovered the same processes independently of Schopenhauer. In any case, a great deal of Schopenhauer's philosophy resides in Freud's psychoanalytic theory. Besides the ideas of repression and sublimation, Freud shared Schopenhauer's belief that irrational (unconscious) forces were the prime motivators of human behavior and that the best we could do was minimize their influence. Both men were therefore pessimistic in their views of human nature.

EXISTENTIALISM

The romantics were not the only philosophers who rebelled against rationalism, empiricism, and sensationalism (that is, against Enlightenment philosophy). Another philosophy also emphasized the importance of meaning in one's life and one's ability to freely choose that meaning. **Existentialism** stressed the meaning of human existence, freedom of choice, and the uniqueness of each individual. For the existentialists, the most important aspects of humans are their personal, subjective interpretations of life and the choices they make in light of those interpretations. Like the romanticists, the existentialists viewed personal experience and feeling as the most valid guides for one's behavior.

Although it is possible to trace the origins of existential philosophy at least as far back as Socrates, who embraced the Delphic dictate "Know thyself" and said, “An unexamined life is not worth living,” one of the first modern existential philosophers was Søren Kierkegaard.

Søren Kierkegaard

The Danish theologian and philosopher **Søren Kierkegaard (1813–1855)** was born on May 5 in Copenhagen. He was the youngest child of a large family, but he and his older brother were the only children to survive. His father, who was 56 when Kierkegaard was born, was a prosperous, God-fearing merchant. Kierkegaard’s mother was his father’s servant before he made her his second wife. His father was a stern teacher of religion, and for many years Kierkegaard equated his father with God. It caused a “great earthquake” when in 1835 Kierkegaard’s father confessed to sexual excesses, and Kierkegaard responded by rebelling against both his father and religion. He accepted both back into his heart on his 25th birthday, which caused him to experience “indescribable joy.” His father died shortly afterward, leaving him a substantial fortune. In deference to his father’s wishes, Kierkegaard began a serious study of theology.

At the University of Copenhagen, Kierkegaard studied theology and then literature and philosophy. He had no financial worries and lived a carefree life. About this time, Kierkegaard decided to ask Regina Olsen, whom he had known for several years, to marry him. After a two-year engagement, Kierkegaard felt there was a “divine protest” because the wedding was based on something untrue (he never said what), and in 1841 he wrote a letter to Regina terminating their engagement:

> It was a time of terrible suffering: To have to be so cruel and at the same time to love as I did. She fought like a tigress. If I had not believed that God had lodged a veto she would have been victorious. (Bretall, 1946, p. 17)

Kierkegaard went to Regina and asked her forgiveness. He described their farewell:

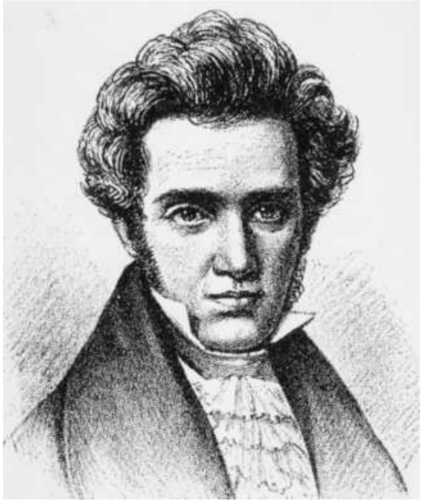
> She said, “promise to think of me.” I did so. “Kiss me,” she said. I did so, but without passion. Merciful God! And so we parted. I spent the whole night crying in my bed.… When the bonds were broken my thoughts were these: either you throw yourself into the wildest kind of life—or else become absolutely religious. (Bretall, 1946, pp. 17–18)

Kierkegaard did the latter. It is interesting to note that Kierkegaard often described a proper relationship with God as a love affair:

> Repeatedly Kierkegaard likened the individual’s relationship with God to a lover’s experience. It is at once painful and happy, passionate but unfulfilled, lived in time yet infinite. Once he had separated himself from Regin[a] Ols[e]n he was free to enter upon his “engagement to God.” (Hubben, 1952, p. 24)

After Kierkegaard broke his engagement with Regina, he went to Berlin, where he thrust himself into the study of philosophy and finished his first major book, *Either/Or* (1843).

All his life, Kierkegaard was melancholic and withdrawn. Many entries in his diary (journals) referred to the fact that even when others saw him as happy, he was actually crying inside.



Mary Evans Picture Library

Søren Kierkegaard

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The following entry from 1836 exemplifies the difference between Kierkegaard's private and public selves: "I have just returned from a party of which I was the life and soul; wit poured from my lips, everyone laughed and admired me—but I went away … and wanted to shoot myself" (Bretall, 1946, p. 7). Some Kierkegaard scholars attribute his melancholia and introversion to his having a hunchback. However, Hubben (1952) believes that the influence of his deformity was probably minimal:

> [Kierkegaard] was weak and sickly and he is likely to have derived from his physical impairment the same spirit of bravado that distinguished Dostoevsky and Nietzsche. But whatever the truth about the hunchback may be, it seems safe to remain conservative toward any of its psychological and religious interpretations. (p. 17)

Kierkegaard's writings received scant attention in his lifetime. He was ridiculed by other philosophers, the public press, and many of his fellow townspeople considered him eccentric. As a student, Kierkegaard initially rejected Christianity and was a devout follower of Hegel. Later, the situation reversed; he rejected Hegel and embraced Christianity. The Christianity that Kierkegaard accepted, however, was not that of the institutionalized church. He was an outspoken critic of the established church for its worldliness and its insistence on the acceptance of prescribed dogma. He said that the most meaningful relationship with God was a purely personal one that was arrived at through an individual's free choice, not one whose nature and content were dictated by the church.

Some of Kierkegaard's most influential books include *Either/Or* (1843), *Fear and Trembling* (1843), *Philosophical Fragments* (1844), *The Concept of Dread* (1844), *Stages on Life's Way* (1845), *Concluding Unscientific Postscript* (1846), *The Present Age* (1846), *Works of Love* (1847), *The Point of View for My Work as an Author* (1848), *The Sickness Unto Death* (1849), *Training in Christianity* (1850), *The Attack Upon "Christendom"* (1854–1855), and *The Unchangeableness of God* (1855).

Considering his subsequent influence on philosophy and religion, it is incredible to note that Kierkegaard died at the age of 44 on November 11, 1855.

Religion as Too Rational and Mechanical. In Kierkegaard's time, the Lutheran church was the official church of Denmark. The state considered it its duty to protect and promote Lutheranism, which it did by requiring religious training in all schools and by elevating the clergy to the status of civil servants. Kierkegaard felt strongly that such a system of state control and protection was against the basic tenets of Christianity. The intensely individual nature of the religious experience was, he thought, discouraged by such a system. Kierkegaard ultimately rejected Hegel's philosophy because it placed too much emphasis on the logical and the rational and not enough on the irrational, emotional side of human experience. For the same reason, Kierkegaard rejected science as too mechanistic: he thought it prevented us from viewing humans as choosing beings. The ultimate state of being, for Kierkegaard, was arrived at when the individual decided to embrace God and take God's existence on faith without needing a logical, rational, or scientific explanation of why or how the decision was determined.

Kierkegaard was deeply concerned that too many Christians, rather than having a true relationship with God, were praying reflexively and accepting religious dogma rationally instead of allowing it to touch them emotionally. Although Kierkegaard would certainly not have agreed with Nietzsche that God is dead (see the next section), he would have agreed that for most people a genuine, personal, emotional relationship with God does not exist and, for those people, it *seems* that God is dead.

Truth Is Subjectivity. According to Kierkegaard, truth cannot be taught by logical argument; truth must be experienced. In the realm of religion, the more logical we are in our attempt to understand God, the less we comprehend him. Believing in God is a "leap of faith," a choosing to believe in

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the absence of any factual, objective information. God, who is unlimited and eternal, cannot be explained, understood, or proved logically. He must be taken on faith, and that is a very personal, subjective choice. Attempting to understand Jesus objectively reveals a number of paradoxes. Christ is both God and man; he is eternal truth existing in finite time; he lived almost 2,000 years ago but also exists presently; and he violates natural law with his miracles. Facts or logic do not remove these paradoxes; they create them. Belief alone can resolve them; subjectivity, *not* objectivity, is truth. Christian faith is something that must be lived; it must be felt emotionally. For it can be neither understood nor truly appreciated as a rational abstraction. For Kierkegaard, it is precisely because we cannot know God objectively that we must have faith in his existence:

> Without risk there is no faith. Faith is precisely the contradiction between the infinite passion of the individual's inwardness and the objective uncertainty. If I am capable of grasping God objectively, I do not believe, but precisely because I cannot do this I must believe…. Without risk there is no faith, and the greater the risk, the greater the faith; the more objective security, the less inwardness (for inwardness is precisely subjectivity), and the less objective security, the more profound the possible inwardness. (Bretall, 1946, pp. 215, 219)

In *Fear and Trembling* (1843), Kierkegaard recalled the biblical account of Abraham preparing to sacrifice his son at God's command. The moment that Abraham lifted the knife to kill his son captures what Kierkegaard meant by religious faith. Such faith is a leap into the darkness accompanied by fear, dread, and anguish. It is precisely the discrepancy existing between human understanding and ultimate truth that creates a paradox. The paradox is the understanding that there are things we can never know, and the greatest paradox of all (the "absolute paradox") is God. We know that God exists, and at the same time, we know that we cannot comprehend him; that is a paradox. Fortunately, God gave humans a way of dealing with such paradoxes, including the absolute paradox, and that was *faith*. We must have faith in eternal truths because there is no way for us to embrace them objectively. The paradox that God became a finite being in the person of Christ can never be explained rationally; it must be taken on faith.

A Love Affair With God. As mentioned previously, Kierkegaard, perhaps reflecting on his ill-fated relationship with Regina Olsen, often referred to an individual's relationship with God as a love affair; it is simultaneously passionate, happy, and painful. He also said that one should read the Bible as one would read a love letter. That is, the reader should let the words touch himself or herself personally and emotionally. The meaning of the words *are* the emotional impact they have on the reader:

> Imagine a lover who has received a letter from his beloved—I assume that God's Word is just as precious to you as this letter is to the lover. I assume that you read and think you ought to read God's Word in the same way the lover reads this letter. (Kierkegaard, 1851/1990, p. 26)

As you do not read a love letter using a dictionary to determine the meaning of its words, neither should you read the Bible that way. The meaning of both the Bible and a love letter is found in the feelings it causes the reader to have. No one should tell you what to feel as you read a love letter or the Bible, nor should anyone tell you what the correct interpretation of either should be. Your feelings and your interpretation define what in the experience is true for you. Truth is subjectivity—*your* subjectivity.

Stages of Personal Freedom. In *Either/Or* (1843), Kierkegaard offers a stage theory of what he calls personal freedom. Most people reside in the **aesthetic stage**. At this stage, people seek out many forms of pleasure and excitement. Like a moth to the flame, they do not recognize their ability to choose among the enticements that draw their attention. People operating at this level

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are hedonistic, and such an existence ultimately leads to boredom and despair. Next is the **ethical stage**. People operating at this level accept the responsibility of making choices but use as their guide ethical principles established by others—for example, moral conventions (say, against drinking and dancing) or church dogma. Although Kierkegaard considered the ethical level higher than the aesthetic level, people operating on the ethical level are still not recognizing and acting on their full personal freedom to choose a path for themselves. Kierkegaard referred to the highest level of existence as the **religious stage**. At this stage, people recognize and accept their responsibility and enter into a unique and personal relationship with God. The nature of this relationship is not determined by convention or by generally accepted moral laws but by the nature of God and by one's self-awareness. People existing on this level are open to possibilities in life that often run contrary to what is generally accepted, and therefore may tend to be seen as nonconformists.

Friedrich Wilhelm Nietzsche

Friedrich Wilhelm Nietzsche (1844–1900), born near Leipzig, was the son of a Lutheran minister and grandson of two clergymen. Nietzsche was five years old when his father died, and he grew up in a household consisting of his mother, sister, two maiden aunts, and his grandmother. He was a model child and an excellent student; by the time he was 10, he had written several plays and composed music. At the age of 14, he entered the famous Schulpforta (a boarding school), where religion was one of his best subjects; he also excelled in his study of Greek and Roman literature. In 1864, he entered Bonn University, where he expressed disgust for the beer drinking and carousing behavior of his fellow students. When Nietzsche's favorite teacher (Friedrich Ritschl) transferred from Bonn to the University of Leipzig, Nietzsche followed him there. Nietzsche's student days ended when, at the age of 24, he accepted an offer he received from the University of Basel to teach classical philology (the study of ancient languages, ideas, and word origins) even before he had received his doctorate. He taught at Basel for 10 years before poor health forced his retirement at the age of 35. His most influential books followed his academic retirement.

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Friedrich Wilhelm Nietzsche

During his years at Basel, Nietzsche wrote *The Birth of Tragedy: Out of the Spirit of Music* (1872) and *Untimely Meditations* (1873–1876), both strongly influenced by and supportive of Schopenhauer's philosophy. After his retirement, his books began to reflect his own thoughts. The most influential of those books were *Human, All-Too-Human* (1878), *The Gay Science* (1882), *Thus Spoke Zarathustra* (1883–1885), *Beyond Good and Evil* (1886), *Toward a Genealogy of Morals* (1887), *The Twilight of the Idols* (1889), *The Antichrist* (1895), and *Nietzsche Contra Wagner* (1895). His last books, *The Will to Power* (1904) and *Ecce Homo* (1908), were published posthumously.

In April 1882, at the age of 37, Nietzsche began a relationship with Lou Salome, the attractive, intelligent, 21-year-old daughter of a Russian general. Hollingdale (1969) described this relationship as "the one wholly serious sexual involvement of Nietzsche's life" (p. 20). Nietzsche looked upon Lou as his intellectual equal and envisioned continuing his life's work with her as his partner. He proposed marriage twice, once through a friend and once directly. In both cases Lou said no. Tanner (2000) refers to this rejection as "the single most devastating experience of Nietzsche's life" (p. 67).

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It was in the aftermath of this experience that Nietzsche began work on *Thus Spoke Zarathustra*. And, as we will see, Nietzsche himself believed that all philosophy is autobiographical.

Incidentally, Lou Salome eventually married Friedrich Carl Andreas, an orientalist. Later in life, Lou Andreas-Salome developed an interest in psychoanalysis and became one of Freud's most valued friends and disciples (Gay, 1988; Weber & Welsch, 1997). For some of the more colorful details concerning Lou Andreas-Salome's involvement in the Freudian inner circle, see Roazen (1992), and for an insight into Lou Andreas-Salome's personal involvement with psychoanalysis and her firsthand accounts of the schisms that occurred during its formative years, see Leavy (1964).

From about 1880, Nietzsche became increasingly isolated from everyday life. On the morning of January 3, 1889, Nietzsche saw a cab driver beating his horse. In sympathy he tearfully threw his arms around the horse's neck and then collapsed. Later he was taken to an asylum, where he began identifying himself as such individuals as the Duke of Cumberland, the Kaiser, Dionysus, "The Crucified," and even God (Hayman, 1999). Be it tertiary syphilis, some other form of psychosis, or stroke (Hubben, 1952), Nietzsche's demented condition continued for 11 years, until his death on August 25, 1900, a few weeks before his 56th birthday. He was buried in his hometown in the cemetery of the church where his father had baptized him.

The Apollonian and Dionysian. Nietzsche held that there are two major aspects of human nature, the Apollonian and the Dionysian. The **Apollonian aspect of human nature** represents our rational side, our desire for tranquility, predictability, and orderliness. The **Dionysian aspect of human nature** represents our irrational side, our attraction to creative chaos and to passionate, dynamic experiences. According to Nietzsche, the best art and literature reflect a fusion of these two tendencies, and the best life reflects controlled passion. Nietzsche believed that Western philosophy had emphasized the intellect and minimized the human passions, and the result was lifeless rationalism.

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Lou Andreas-Salomé

Nietzsche saw as one of his major goals the resurrection of the Dionysian spirit. Do not just live, he said, live with passion. Do not live a planned, orderly life; take chances. Even the failures that may result from taking chances could be used to enhance personal growth. Thus, what Nietzsche was urging was not a totally irrational, passionate life but a life of reasonable passion, a life worthy of both Apollo and Dionysus.

Nietzsche the Psychologist. Nietzsche viewed himself as primarily a psychologist: "That a psychologist without equal speaks from my writing, is perhaps the first insight reached by a good reader—a reader as I deserve him" (Golomb, 1989, p. 13). Indeed, as we shall see, much of what would later appear in Freud's writings appeared first in Nietzsche's. Furthermore, Freudian and Nietzschian psychology shared the goal of helping individuals gain control of their powerful, irrational impulses in order to live more creative, healthy lives.

At the heart of Nietzsche's psychology is the tension between Apollonian and Dionysian tendencies. The Dionysian tendency, which he referred to as "barbarian," could not express itself unabated

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without destroying the individual. Nietzsche anticipated Freud by referring to these barbarian urges as *das es*, or the id. For Dionysian impulses (what Freud called primary processes) to gain expression, they must be modified (sublimated) by Apollonian rationality (what Freud called secondary processes). For both Nietzsche and Freud, this sublimation explains works of art and other cultural achievements, and it also explains the content of dreams. Dreams provide an example of barbarian chaos modified by Apollonian rationality, the modification creating what we remember as a dream. Without the Dionysian influence, the Apollonian aspect of personality would be without emotional content: "Apollo could not live without Dionysus" (Golomb, 1989, p. 48). Likewise, without the Apollonian influence, the Dionysian aspect of personality would remain formless. If Dionysian impulses become too threatening, Apollonian rationality can repress them. Nietzsche often discussed the concept of repression, which later was to become a cornerstone of Freudian psychoanalysis. For example, in *Beyond Good and Evil* (1886/1998a), Nietzsche said, " 'I have done that,' says my memory. 'I cannot have done that,' says my pride and remains unshakeable. Finally memory yields" (p. 58).

Freud and Nietzsche also diverge. For example, Freud's super-ego—the internalization of external standards—serves to protect us from our own natural desires, a notion that Nietzsche would have utterly rejected. For Nietzsche, internalizing the external standards of others (such as the Church, or social convention) was a bad thing. Another major disagreement between Nietzschian and Freudian psychologies concerns determinism; Freud accepted determinism and Nietzsche did not. In clear anticipation of modern existential psychology, Nietzsche said, "Every man is a unique miracle"; "We are responsible to ourselves for our own existence"; and "Freedom makes us responsible for our characters just as artists are responsible for their creations" (Golomb, 1989, pp. 123, 128, 129). We are, however, only *potentially* free. Personality is an artist's creation, but some people are better artists than others. If people use their will to power (see below) to mold the ingredients available to them into an authentic, unique personality, they are free. If they live in accordance with moral standards not of their own creation, they are slaves. The difference, then, between freedom and slavery is a matter of choice: "Everyone who wishes to become free must become free through his own endeavor.... Freedom does not fall into any man's lap as a miraculous gift" (Golomb, 1989, p. 244).

The Death of God. In *The Gay Science* (1882/2001, pp. 119–120), Nietzsche has a madman proclaim that "God is dead" and hail this as one of the most significant events in human history. When people ignore him, the madman concludes, "I come too early.... My time is not yet." He continues, "This deed is still more remote to them than the remotest stars—*and yet they done it themselves*." Nietzsche (1889/1998b) asked, "Is man just one of God's mistakes? Or is God just one of man's?" (p. 5). In any case, Nietzsche announced that God was dead and that we had killed him. By *we*, he meant the philosophers and scientists of his day. Because we humans had relied on God for so long for the ultimate meaning of life and for our conceptions of morality, we are lost now that he is dead. Where do we now look for meaning? For moral ideals? The same philosophers and scientists who killed God also took purpose from the universe, as was found in Aristotle's teleological philosophy, and stripped humans of any special place in the world. Evolutionary theory, for example, showed that humans have the same lowly origin as other living organisms and share the same fate: death. Furthermore, evolutionary principles are without purpose. Natural selection simply means that organisms possessing traits that allow adaptation to the environment will survive and reproduce. Thus, humans cannot even take pride or find meaning in the fact that they have survived longer or differently than other species. Evolution in no way implies improvement. Nietzsche described Darwinian theory as "true but deadly" (Golomb, 1989, p. 138). Astronomy too had shown that humans do not occupy a special place in the universe. The earth is simply a medium-size ball of clay revolving around one of hundreds of billions of suns.

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Thus, there is no God who cares for us, our species occupies no significant station in the animal kingdom, and the earth is just one more meaningless heavenly body. With the death of God came the death of his shadows (metaphysics) as well. Without religion, science, and metaphysics, humans are left in a "cosmic *tabula rasa*" without transcendental principles or forces to guide them. According to Nietzsche, the absence of these traditional sources of meaning and morality means that humans are on their own. For Nietzsche, there are no abstract truths waiting to be discovered by all; there are only individual perspectives. Even the various philosophies that have been created through the ages are to be understood as elaborations of individual perspectives: "Every great philosophy to date has been the personal confession of its author, a kind of unintended and unwitting memoir" (1886/1998a, p. 8). Thus, according to Nietzsche, all philosophies, including his own, are autobiographical.

Of course, Nietzsche's **perspectivism** was directly contrary to Enlightenment philosophy and is seen, by many, as the forerunner of postmodernism (see Chapter 20).

Convictions. In *Human, All Too Human* (1878/2006), Nietzsche said, "Convictions are more dangerous enemies of truth than lies" (p. 209). He defined **conviction** as the "belief in the possession of absolute truth on any matter of knowledge" (p. 236). It is, according to Nietzsche, convictions that have caused countless humans to sacrifice themselves throughout history. In the realm of religion, convictions are common and are unchallengeable for those entertaining them because "To allow their belief to be wrested from them probably meant calling in question their eternal salvation" (p. 237). **Opinions** are different because they are tentative, challengeable, and easily modified in light of new information. In other words, convictions are thought to reflect Truth and opinions truth; convictions reflect certainty, opinions probability. It is, according to Nietzsche, convictions that cause fanaticism, not opinions.

> It is not the struggle of opinions that has made history so turbulent; but the struggle of belief in opinions—that is to say, of convictions. If all those who thought so highly of their convictions, who made sacrifices of all kinds for them, and spared neither honour, body, nor life in their service, had only devoted half of their energy to examining their right to adhere to this or that conviction and by what road they arrived at it, how peaceable would the history of mankind now appear! How much more knowledge would there be! (p. 237)

Will to Power. According to Nietzsche, the answer to our predicament can be found only within ourselves. Humans need to acquire knowledge of themselves and then act on that knowledge. Meaning and morality cannot (or should not) be imposed from the outside; it must be discovered within. Such self-examination reveals that the most basic human motive is the **will to power**. Like Schopenhauer, Nietzsche believed that humans are basically irrational. Unlike Schopenhauer, however, Nietzsche thought that the instincts should not be repressed or sublimated but should be given expression. Even aggressive tendencies should not be totally inhibited. The will to power can be fully satisfied only if a person acts as he or she feels—that is, acts in such a way as to satisfy all instincts: "The will to power is the primitive motive force out of which all other motives have been derived" (Sahakian, 1981, p. 80). Even happiness, which the utilitarians and others claimed to be so important as a motive, is the result of the increase in one's power: "The only reality is this: *The will of every centre of power to become stronger*—not self-preservation, but the desire to appropriate, to become master, to become more, to become stronger" (Sahakian, 1981, p. 80). And in *The Gay Science*, Nietzsche said, "The great and the small struggle always revolves around superiority, around growth and expansion, around power—in accordance with the will to power which is the will of life" (1882/2001, p. 292). For Nietzsche, then, all conceptions of good, bad, and happiness are related to the will to power:

> What is good? Everything that heightens the feeling of power in man, the will to

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> power, power itself. What is bad? Everything that is born of weakness. What is happiness? The feeling that power is growing, that resistance is overcome. (Kaufmann, 1982, p. 570)

Thus, Nietzsche disagreed with anyone who claimed that the master human motive was self-preservation (such as Spinoza and Schopenhauer). Humans do not attempt to preserve themselves; rather they attempt to become more than they were, or at least, according to Nietzsche, this is what they should attempt.

Supermen. The will to power is the tendency to gain mastery over one's self and one's destiny. If given expression, the will to power causes a person to seek new experiences and to ultimately reach his or her full potential. Such individual growth cannot (or should not) be inhibited by conventional morality and thus must go "beyond good and evil." People approaching their full potential are **supermen** because standard morality does not govern their lives. Instead, they rise above such morality and live independent, creative lives. Nietzsche declared that "All gods are dead: now we want the Superman to live" (1883–1885/1969, p. 104).

It is in *Thus Spoke Zarathustra* that Nietzsche most fully described his concept of the superman. (It should be noted that Nietzsche's term *Übermensch* can be translated as "overman," "higher-man," or "superman.") After 10 years of solitude and contemplation in the mountains, Zarathustra decides to return to civilization and share his insights with his fellow humans:

> *I teach you the Superman*. Man is something that should be overcome. What have you done to overcome him? … What is the ape to men? A laughing-stock or a painful embarrassment. And just so shall man be to the Superman: A laughing-stock or a painful embarrassment. You have made your way from worm to man, and much in you is still worm…. Behold, I teach you the Superman. The Superman is the meaning of the earth. Let your will say: The Superman *shall be* the meaning of the earth! I entreat you, my brothers, *remain true to the earth*, and do not believe those who speak to you of superterrestrial hopes! They are poisoners, whether they know it or not. They are despisers of life, atrophying and self-poisoned men, of whom the earth is weary; so let them be gone! (Nietzsche, 1883–1885/1969, pp. 41–42)

Humans are in a precarious position. We are no longer animals, we are not yet supermen, and God, being dead, cannot help us: "Man is a rope, fastened between animal and Superman—a rope over an abyss. A dangerous going-across, a dangerous wayfaring, a dangerous looking-back, a dangerous shuddering and staying-still" (Nietzsche, 1883–1885/1969, p. 43). The problems characterizing the human condition are solved one person at a time. If every individual strove to be all that he or she could be, more general human problems would solve themselves. A prerequisite, then, for an improvement in the human condition is self-improvement:

> Physician, heal yourself: Thus you will heal your patient too. Let his best healing-aid be to see with his own eyes him who makes himself well. There are a thousand paths that have never yet been trodden, a thousand forms of health and hidden islands of life. Man and man's earth are still unexhausted and undiscovered…. Truly, the earth shall yet become a house of healing! And already a new odour floats about it, an odour that brings health—and a new hope! (Nietzsche, 1883–1885/1969, pp. 102–103)

The superman, as we have seen, exercises his will to power by expressing all thoughts, even negative ones:

> Let us *speak* of this, you wisest men, even if it is a bad thing. To be silent is worse; all suppressed truths become poisonous. And let everything that can break upon our truths—break! There is many a house still to build! (Nietzsche, 1883–1885/1969, p. 139)

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Like Goethe, Nietzsche did not believe that negative experiences or impulses should be denied. Rather, one should learn from such experiences. Nietzsche believed that the journey toward one's personal heaven often requires traveling through one's personal hell. Nietzsche (1889/1998b) famously said, "Whatever does not kill me makes me stronger" (p. 5) and gave the following example:

> I have often asked myself whether I am not more heavily obligated to the hardest years of my life than to any others…. And as for my long sickness, do I not owe it indescribably more than I owe to my health? I owe it a *higher* health—one which is made stronger by whatever does not kill it. *I also owe my philosophy to it.* Only great pain is the ultimate liberator of the spirit…. Only great pain, that long, slow pain in which we are burned with green wood, as it were—pain which takes its time—only this forces us philosophers to descend into our ultimate depths and to put away all trust, all good-naturedness, all that would veil, all mildness, all that is medium—things in which formerly we may have found our humanity. I doubt that such a pain makes us "better," but I know that it makes us more *profound.* (Kaufmann, 1982, pp. 680–681)

The notion of supermen was Nietzsche's answer to the human moral and philosophical dilemma. The meaning and morality of one's life come from within oneself. Healthy, strong individuals seek self-expansion by experimenting, by living dangerously. Life consists of an almost infinite number of possibilities, and the healthy person (the superman) explores as many of them as possible. Religions or philosophies that teach pity, humility, blind obedience, self-restraint, guilt, or a sense of community are simply incorrect.

On the other hand, Nietzsche very much admired the ancient Cynics (see Chapter 3) and referred to them often in his works. What he especially appreciated about Cynicism was its criticism of conventional morality (Niehues-Pröbsting, 1996). For Nietzsche, the good life is ever-changing, challenging, devoid of regret, intense, creative, and risky. It is *self-overcoming.* Acting in accordance with the will to power means living a life of becoming more than you were, a life of continual self-renewal. Science, philosophy, and especially religion can only stifle the good life—the life of the superman. Any viewpoint that promotes herd conformity as opposed to individuality should be actively avoided. Nietzsche believed that repressive civilization is the primary cause of humans' mental anguish, a belief later shared by Freud.

The meaning of life, then, is found within the individual, and the daring, the supermen, will find it there: "Only dare to believe in yourselves—in yourselves and in your entrails! He who does not believe in himself always lies" (Nietzsche, 1883–1885/1969, p. 146). To be a superman, one must necessarily be intensely individualistic; and yet, all supermen have in common the same philosophy of life: "I am Zarathustra the godless: Where shall I find my equal? All those who give themselves their own will and renounce all submission, they are my equals" (Nietzsche, 1883–1885/1969, p. 191).

Thus, Nietzsche advised people to use their will to power to combine their Dionysian and Apollonian tendencies in their own unique way. This artistic creation is the only meaningful basis of morality. Beyond this concept, Nietzsche gave no general formula for living. Through Zarathustra, Nietzsche (1883–1885/1969) responded to those looking to him for a philosophy of life: " 'This … is … *my* way: where is yours?' Thus I answered those who asked me 'the way.' For *the* way—does not exist!" (p. 213). And earlier through *Zarathustra*, Nietzsche said, "One repays a teacher badly if one remains only a pupil" (p. 103).

Indeed, as some critics have noted, Nietzsche's writings often contain harsh statements that would not be wise to embrace as presented. Such statements are better viewed as challenges to the reader's own preconceptions and as an invitation for personal inquiry. For Nietzsche then, it was important for each individual to find the meaning in his or her own life and then to live in accordance with that meaning. In accordance with what would become a

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canon of existentialism, Nietzsche said, "If you have your *why?* for life, then you can get along with almost any *how?*" (1889/1998b, p. 6).

Misunderstanding of Nietzsche's Supermen. Throughout history, scientific and philosophical works have often been distorted in order to support political ideologies. Nietzsche's philosophy is an example. His philosophy was embraced by the German National Socialists (the Nazis), who claimed that the German people were the supermen to whom Nietzsche referred. For the Nazis, *supermen* meant "superior men," and the Germans were, they believed, superior. Nothing could have been more alien to Nietzsche than the thought of national or racial superiority. Nietzsche dissolved his close relationship with the famous German composer Richard Wagner partly because Wagner held strong nationalistic and anti-Semitic views (Blackburn, 1994). Each individual, according to Nietzsche, has the potential to be a superman. What differentiates the superman from the nonsuperman is passion, courage, and insight—nothing else. As examples of supermen, Nietzsche offered the historical Jesus, Goethe (from whom Nietzsche borrowed the term *superman*), Dostoevsky, and himself. Freud agreed that Nietzsche should be on the list of supermen: "[Freud] said of Nietzsche that he had a more penetrating knowledge of himself than any other man who ever lived or was ever likely to live. From the first explorer of the unconscious this is a handsome compliment" (Jones, 1955, p. 344).

Again, both Schopenhauer and Nietzsche believed that nonrational instincts strongly influence human behavior. But whereas Schopenhauer believed that such instincts should be repressed, Nietzsche thought that they should be largely expressed. In this regard, Freud was influenced most by Schopenhauer, whereas one of Freud's early followers, Alfred Adler, was influenced more by Nietzsche. Not only did Adler stress the gaining of power in order to overcome feelings of inferiority, he also shared Nietzsche's belief that weak individuals often gain power over others by eliciting their pity or by hurting them with their suffering. Freud also recognized this phenomenon in his concept of "secondary gains" from neuroses. Freud's colleague Carl Jung was also influenced by Nietzsche. In Jung's famous distinction between introversion and extroversion, the introvert was viewed as dominated by the Apollonian tendency and the extrovert by the Dionysian tendency (Golomb, 1989).

KIERKEGAARD AND NIETZSCHE AS PSYCHOLOGY

Nietzsche was apparently unaware of Kierkegaard's work, yet he developed ideas that were in many ways similar to Kierkegaard's. Like Kierkegaard, Nietzsche rejected what was conventionally accepted, such as the organized church and science. For both men, Hegelian philosophy was a favorite target, and both men preached reliance on direct, personal experience. The major difference between the two was that Kierkegaard accepted the existence of God, whereas for Nietzsche God did not exist. Both Kierkegaard and Nietzsche alienated almost everyone, especially the establishment. For example, almost no one bought Kierkegaard's books when they were published. Three years after the publication of his *Philosophical Fragments* (1844/1985), it had sold 229 copies from a printing of 525 (Hong & Hong, 1985, p. xix). Now *Fragments* is highly regarded and considered one of Kierkegaard's finest, most influential works.

As noted previously, substantial parallels between Nietzsche and the psychodynamic approaches of both Freud and Adler abound. Other modern clinical psychologists—such as Irvin Yalom—have also acknowledged the influence of Nietzsche. Likewise, Kierkegaard can be seen as an anticipator of modern clinical psychology (Nordentoft, 1978). His *The Concept of Dread* (1844) is a study of what we would now call anxiety, whereas his book *The Sickness Unto Death* (1849) is a consideration of depression. Indeed, much from (romanticism and) existentialism has melded to form the third-force movement in psychology, exemplified by the theories of Rogers, Maslow, May, and Kelly, which we will explore in Chapter 17.

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If existentialism could be captured as a catch-phrase, it would surely be the admonition to never let other people (be it the voice of science, the Church, or any other authority) do your thinking for you. Such an idea would find favor with subsequent philosophers—including Martin Heidegger, and the Nobel Prize winners Jean-Paul Sartre and Albert Camus—all of whom we will also see in Chapter 17.

The romantic and early existential philosophers considered here had much in common. The themes running through both philosophies are an emphasis on human existence; the importance of subjective experience; a deep respect for individuality; a belief in free will; and a distrust of the grandiose theories of human nature created by the rationalists, empiricists and sensationalists, and natural scientists. The latter theories, they believed, minimized the importance of the individual attempting to make sense out of his or her life and freely acting upon his or her interpretations of life's meaning. Similar ideas are echoed in postmodernism, which will be discussed in Chapter 20.

SUMMARY

The accomplishments of individuals such as Hobbes, Bacon, Descartes, and Newton ushered into Western philosophy a period called the Enlightenment. The Enlightenment was characterized by skepticism toward religious dogma and other forms of traditional authority. There was widespread optimism that the principles governing the universe could be discovered and applied to the betterment of humankind. Under the umbrella of the Enlightenment, the philosophies of empiricism, sensationalism, and rationalism pictured humans as complex machines, products of experience, or highly rational beings operating in accordance with lofty, abstract principles. In the opinion of the romantics, all these philosophies left something important out of their analyses. Alternatively, the romantics emphasized inner, personal experience and distrusted both science and the philosophers who pictured humans as products of experience, as machines, or as totally rational beings.

Rousseau is usually considered the father of modern romanticism. He believed that humans are born free and good but are contaminated by society. As a guide for living and for believing, the natural impulses of the "heart" could be trusted. Rousseau believed that humans have both an individual will and a general will and that for government to work, people must deny their individual will. Education should take into consideration a child's natural curiosity rather than attempting to mold a child. Goethe, a scientist, poet, and philosopher, viewed life as consisting of choices between conflicting forces (such as good and evil). He believed that the best life is one lived with passion and that results in self-expansion. He also believed that the physical sciences, although effective in providing useful information about the physical world, are of limited value when it comes to understanding people.

Following Kant, Schopenhauer distinguished between the noumenal world (things in themselves) and the phenomenal world (consciousness). What Kant called the noumenal world, Schopenhauer called the universal will. When manifested in an individual human, the universal will becomes the will to survive, which is the most powerful motive for human behavior. Life, according to Schopenhauer, consists of an unending cycle of needs and need satisfaction. Because intelligent organisms are most aware of their needs, they suffer more than unintelligent organisms do. Satisfying our needs simply postpones death, which is inevitable. The only way to minimize human suffering is to deny or minimize one's needs. Needs can be sublimated into such pursuits as music, art, and poetry. Schopenhauer's philosophy had a considerable influence on Freud's psychoanalytic theory.

Another reaction against Enlightenment philosophy was existentialism. The existentialist stressed meaning in life, freedom of choice, subjective experience, personal responsibility, and the uniqueness of the individual. Kierkegaard is generally considered the first existential philosopher. He believed that rationalistic philosophy, science, and the organized church discouraged people from having a deep, personal relationship with God. Logic and facts have nothing to do with such a relationship, which must be based on faith alone. By one's accepting God on faith, God becomes a living, emotional reality in one's subjective experience. For Kierkegaard, the only truth is subjective truth—that is, truth that exists as a personal belief. Furthermore, the existence of God cannot and need not be proved by rational argument; it can only be taken on faith. One should become emotionally involved with God and read his word (the Bible) as one would read a love letter.

Nietzsche agreed with Schopenhauer that many human desires are irrational, but disagreed with him that they should be repressed or sublimated. For Nietzsche, the basic human motive is the will to power, which is satisfied when a person acts as he or she feels. Acting on primal instincts causes a person to have new experiences and thus to develop greater potential as a person. According to Nietzsche, science, religion, rationalism, and empiricism stifle irrationality and thereby inhibit human development. Nietzsche believed that rational philosophy and science had emphasized the Apollonian, or rational, aspect of human nature at the expense of the Dionysian aspect. He believed that giving reasonable expression to both aspects of human nature is best. He also believed that the only source of information for what is good or bad, desirable or undesirable, is the individual. According to Nietzsche, there are no universal truths, only individual perspectives. There is considerable similarity between Nietzsche's perspectivism and contemporary postmodernism. Nietzsche referred to humans who have the courage to live in accordance with their own values, thus rising above conventional morality, as supermen (higher men). Supermen experiment with life and are constantly in the process of becoming something other than what they were.

DISCUSSION QUESTIONS

1. What was romanticism a reaction against? Discuss the major features of the romantic movement.
2. What assumptions did Rousseau make about human nature? What did he mean by his statement "Man is born free yet we see him everywhere in chains"?
3. What did Rousseau and Hobbes have in common? In what ways did they disagree?
4. Summarize Rousseau's views on education.
5. How did Goethe view life? What was his attitude toward science? What were his contributions to psychology?
6. For Schopenhauer, what is the primary motive for human behavior? Discuss the implications of this motive for human existence.
7. What did Schopenhauer suggest we could do to minimize the influence of the powerful, irrational forces within us?
8. What is existentialism? How does existentialism differ from romanticism?
9. What type of religion did Kierkegaard oppose? Which type did he promote?
10. What did Kierkegaard mean by his statement "Truth is subjectivity"?
11. Describe the type of relationship Kierkegaard believed individuals should have with God.
12. Describe what Kierkegaard referred to as the three stages toward full personal freedom.
13. What were the important aspects of Freudian psychoanalysis anticipated by Nietzsche?
14. Discuss the importance of innate Dionysian and Apollonian tendencies for Nietzsche's psychology.
15. What, according to Nietzsche, were the implications of the death of God (and his "shadows") for human existence?

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16. Discuss Nietzsche's distinction between opinions and convictions. Which did he believe had a negative influence on human history?
17. According to Nietzsche, what are supermen? Give an example of how Nietzsche's conception of supermen has been misunderstood.
18. What did the philosophies of romanticism and existentialism have in common?

SUGGESTIONS FOR FURTHER READING

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GLOSSARY

Aesthetic stage According to Kierkegaard, the first stage in the growth toward full personal freedom. At this stage, the person delights in many experiences but does not exercise his or her freedom.

Apollonian aspect of human nature According to Nietzsche, that part of us that seeks order, tranquility, and predictability.

Convictions According to Nietzsche, beliefs that are thought to correspond to some absolute truth and, as such, are immutable and dangerous. (See also **Opinions.**)

Dionysian aspect of human nature According to Nietzsche, that part of us that seeks chaos, adventure, and passionate experiences.

Enlightenment A period during which Western philosophy embraced the belief that unbiased reason or the objective methods of science could reveal the principles governing the universe. Once discovered, these principles could be used for the betterment of humankind.

Ethical stage According to Kierkegaard, the second stage in the growth toward full personal freedom. At this stage, the person makes ethical decisions but uses principles developed by others as a guide in making them.

Existentialism The philosophy that examines the meaning in life and stresses the freedom that humans have to choose their own destiny. Like romanticism, existentialism stresses subjective experience and the uniqueness of each individual.

General will According to Rousseau, the innate tendency to live harmoniously with one's fellow humans.

Goethe, Johann Wolfgang von (1749–1832) Believed that life is characterized by choices between opposing forces and that much about humans is forever beyond scientific understanding.

Kierkegaard, Søren (1813–1855) Believed that religion had become too rational and mechanical. He believed that a relationship with God should be an intensely personal and a highly emotional experience, like a love affair. Taking the existence of God on faith makes God a living truth for a person; thus Kierkegaard contended that truth is subjectivity.

Nietzsche, Friedrich Wilhelm (1844–1900) Claimed that humans could no longer rely on religious superstition or metaphysical speculation as guides for living; instead, they must determine life's meaning for

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themselves. By exercising their will to power, people can continue to grow and overcome conventional morality. The term *superman* described those who experimented with life and feelings and engaged in continuous self-overcoming.

Noble savage Rousseau's term for a human not contaminated by society. Such a person, he believed, would live in accordance with his or her true feelings, would not be selfish, and would live harmoniously with other humans.

Opinions According to Nietzsche, beliefs that are tentative and modifiable in light of new information and, therefore, reasonable. (See *also* **Convictions.**)

Perspectivism Nietzsche's contention that there are no universal truths, only individual perspectives.

Phenomenology Refers to Goethe's assertion that meaningful whole experiences are the proper unit of analysis when studying human nature.

Religious stage According to Kierkegaard, the third stage in the growth toward full personal freedom. At this stage, the person recognizes his or her freedom and chooses to enter into a personal relationship with God.

Romanticism The philosophy that stresses the uniqueness of each person and that values irrationality much more than rationality. According to the romantic, people can and should trust their own natural impulses as guides for living.

Rousseau, Jean-Jacques (1712–1778) Considered the father of modern romanticism, Rousseau believed that human nature is basically good and that the best society is one in which people subjugate their individual will to the general will. The best education occurs when education is individualized and when a student's natural abilities and curiosity are recognized.

Schopenhauer, Arthur (1788–1860) Believed that the will to survive is the most powerful human motive. Life is characterized by a cycle of needs and need satisfaction, and need satisfaction simply postpones death. The most people can do is to minimize the irrational forces operating within them by sublimating or repressing those forces.

Supermen The name Nietzsche gave to those individuals who have the courage to rise above conventional morality and herd conformity and to follow their own inclinations instead. The German word *Ubermensch* can be translated as "overman," "higherman," or "superman."

Will to power According to Nietzsche, the basic human need to become stronger, more complete, and more superior. While satisfying the will to power, a person continually becomes something other than he or she was.

Will to survive According to Schopenhauer, the powerful need to perpetuate one's life by satisfying one's biological needs.

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8

Physiology and Psychophysics

Scientific achievements of the 17th and 18th centuries allowed longstanding philosophical questions to be examined in new, more precise ways. Much had been learned about the physical world, and it was now time to direct scientific method toward the study of the physiological mechanisms by which we come to know the physical world. Basically, the question was: How do external events come to be represented in consciousness? Everything from sense perception to motor reactions was studied intensely, and this study eventually gave birth to experimental psychology. If we are interested in discovering the origins of the matters that are central to psychology, we need to go back to the early Greeks. If, however, we are interested in the origins of *experimental* psychology, we must look to early developments in other empirical sciences such as physiology, anatomy, neurology, and even physics and astronomy.

OBJECTIVE AND SUBJECTIVE DIFFERENCES

It was astronomers who first realized that the type of knowledge human physiology provided might be useful to all sciences. In 1795, astronomer Nevil Maskelyne and his assistant David Kinnebrook were setting ships' clocks according to when a particular star crossed a hairline in a telescope. Maskelyne noticed that Kinnebrook's observations were about a half-second slower than his. Kinnebrook was warned of his "error" and attempted to correct it. Instead, however, the discrepancy between his observations and Maskelyne's increased to 8/10ths of a second, and Kinnebrook was relieved of his duty. Twenty years later, the incident came to the attention of the German astronomer Friedrich Bessel (1784–1846), who speculated that the error had not been due to incompetence but to *individual differences* among observers. Bessel set out to compare his observations with those of his colleagues and indeed found systematic differences among them. This was the first **reaction-time** study, and it was used to correct differences among observers. This was done by calculating **personal equations**. For example, if 8/10ths of a second was added to Kinnebrook's **reaction time**, his observations could be equated with Maskelyne's. Bessel found systematic differences among individuals and a way to compensate for those differences, but his findings did not have much impact on the early development of experimental psychology.

As we will see, the early experimental psychologists were interested in learning what was true about human consciousness in *general*; therefore, individual differences found among experimental subjects were generally attributed to sloppy methodology. Later in psychology's history (after Darwin), the study of individual differences was to be of supreme importance.

Besides showing the influence of the observer on observations, the personal equation was important because the quantitative assessment that it allowed began to cast doubt on the claims of Kant and others that psychology could not be a science. In a sense, the physical sciences made scientific psychology inevitable:

> Once the physical sciences were started and well under way, it was inevitable that scientific psychology should arise. The older sciences themselves made it necessary. Investigators were repeatedly having their attention drawn to the observing organism and to the necessity of taking its reactions into consideration in order to make their own accounts exact and complete. (Heidbreder, 1933, p. 74)

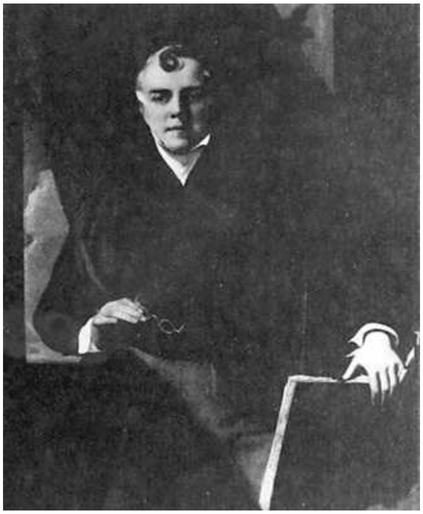
Discrepancy and Reality

Of course, the demonstration of *any* discrepancy between a physical event and a person's perception of that event was of great concern to the natural scientists, who viewed their jobs as accurately describing and explaining the physical world. The problem created by Galileo's and Locke's distinction between primary and secondary qualities could be avoided by simply concentrating on primary qualities—that is, concentrating on events for which there was a match between their physical qualities and the sensations that they create. It was becoming increasingly clear, however, that the mismatch between physical events and the perceptions of those events was widespread. Newton (1704/1952) had observed that the experience of white light is really a composite of all colors of the spectrum, although the individual colors themselves are not perceived. In 1760 Van Musschenbroek discovered that if complementary colors such as yellow and blue are presented in proper proportions on a rapidly rotating disc, an observer sees neither yellow nor blue but gray. It was evident that often there was not a point-to-point correspondence between physical reality and the psychological experience of that reality.

Because the most likely source of the discrepancy was the responding organism, physical scientists had reason to be interested in physiology, which studied the biological processes by which organisms interact with the physical world. Physiologists studied the nature of nerves, neural conduction, reflexive behavior, sensory perception, brain functioning, and, eventually, the systematic relationship between sensory stimulation and sensation. It was the work of physiologists that provided the link between the questions of philosophy and the soon-to-be science of psychology. Thus, to a large extent, both the content of what was to become psychology and the methodologies used to explore that content were furnished by physiology.

BELL-MAGENDIE LAW

Until the 19th century, two views prevailed about what nerves were. One was Descartes's view that a nerve consisted of fibers that connected sense receptors to the brain. These fibers were housed in hollow tubes that in turn transmitted the "animal spirits" from the brain to the muscles. The second was Hartley's view that nerves were the means by which "vibrations" were conducted from the sense receptors to the brain and from the brain to the muscles.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Charles Bell

Courtesy of the National Library of Medicine

François Magendie

In 1811 the great British physiologist **Charles Bell (1774–1842)** printed and distributed to his friends 100 copies of a pamphlet that summarized his groundbreaking research on the anatomical and functional discreteness of sensory and motor nerves. Operating on rabbits, Bell demonstrated that sensory nerves enter the posterior (dorsal) roots of the spinal cord and the motor nerves emerge from the anterior (ventral) roots. Bell's discovery separated nerve physiology into the study of sensory and motor functions—that is, into a study of sensation and movement. Bell's finding was significant because it demonstrated that specific mental functions are mediated by different anatomical structures.

That there are sensory and motor nerves is actually an idea articulated from empirical observations as far back as Eristratus of Alexandria (ca. 300 B.C.) and reinforced by Galen's study of gladiators and soldiers in the second century A.D. It was Bell, however, who provided the scientists of his day with clear-cut experimental evidence. As mentioned, Bell circulated his findings only among his friends. This explains why the prominent French physiologist **François Magendie (1783–1855)** could publish similar results 11 years later without being aware of Bell's findings. A heated debate arose among Bell's and Magendie's followers about the priority of the discovery. History has settled the issue by referring to the discovery as the **Bell-Magendie law** (for more details on the Bell-versus-Magendie controversy, see Cranefield, 1974).

After Bell and Magendie, it was no longer possible to think of nerves as general conveyers of vibrations or spirits. Now a "law of forward direction" governed the nervous system. Sensory nerves carried impulses forward from the sense receptors to the brain, and motor nerves carried impulses forward from the brain to the muscles and glands. The Bell-Magendie law demonstrated separate sensory and motor tracts in the spinal cord and suggested separate sensory and motor regions in the brain.

DOCTRINE OF SPECIFIC NERVE ENERGIES

Born in Koblenz, Germany, the famed physiologist **Johannes Müller (1801–1858)** expanded the Bell-Magendie law by devising the **doctrine of specific nerve energies**. After receiving his doctorate from the University of Bonn in 1822, Müller remained there as professor until 1833, when he accepted the newly created chair of physiology at the University of Berlin. Following Bell's suggestion, Müller demonstrated that there are different types of sensory nerves, each containing a characteristic energy, and that when they are stimulated, a characteristic sensation results. In other words, each nerve responds in its own characteristic way *no matter how it is stimulated*. For example, stimulating the eye with light waves, electricity, pressure, or by a blow to the head will all cause visual sensations. **Emil Du Bois-Reymond (1818–1896)**, one of Müller's students, went so far as to say that if we could cut and cross the visual and auditory nerves, we would hear with our eyes and see with our ears (Boring, 1950, p. 93).

Adequate Stimulation. Although Müller claimed that various nerves contain their own specific energy, he did not think that all the sense organs are equally sensitive to the same type of stimulation. Rather, each of the types of sense organs is maximally sensitive to a certain type of stimulation. Müller called this "specific irritability," and it was later referred to as **adequate stimulation**. The eye is most easily stimulated by light waves, the ear by sound waves, the skin by pressure, and so on. The eye can be stimulated by pressure, but pressure is a less adequate stimulus for vision than is a light wave. As we experience the environment, this differential sensitivity of the various senses provides an array of sensations. In this way, a "picture" of the physical environment is formed, but the nature of the picture—for example, how articulated it is—depends on the sensory systems that humans possess.

For Müller, then, the correspondence between our sensations and objects in the physical world is determined by our senses and their specific irritability. Müller agonized over the question of whether the characteristics of the nerve itself or the place in the brain where the nerve terminates accounts for specificity. He concluded that the nerve was responsible, but subsequent research proved that brain location is the determinant.

Consciousness, Sensations, and Reality. The most significant implication of Müller's doctrine for psychology was that the nature of the central nervous system, not the nature of the physical stimulus, determines our sensations. Müller's findings underscored that we are never conscious of objects in the physical world but of various sensory impulses in the brain linked to those real objects. It follows then that our knowledge of the physical world must be limited to the types of sense receptors we possess.

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Johannes Müller

An ardent Kantian, Müller believed that he had found the physiological equivalent of Kant's categories of thought. According to Kant, sensory information is transformed by the innate categories of thought before it is experienced consciously. For Müller, the nervous system is the intermediary between physical objects and consciousness. Kant's nativism stressed mental categories, whereas Müller's stressed physiological mechanisms. In both cases, sensory information is modified, and therefore what we experience consciously is different from what is physically present. For Müller, however, sensations did not exhaust mental life. In his famous *Handbuch der Physiologie der Menschen* (*Handbook of Human Physiology*, 1833–1840), in a section titled "Of the Mind," he postulated a mind capable of attending to some sensations to the exclusion of others. Thus, even in his otherwise mechanistic system, Müller found room for an active mind, again in allegiance to Kant.

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Müller was one of the greatest experimental physiologists ever. His *Handbuch* summarized what was known about human physiology at the time. Müller also established the world's first Institute for Experimental Physiology at the University of Berlin. In addition, Müller understood the close relationship between physiology and psychology. He said, "Nobody can be a psychologist, unless he first becomes a physiologist" (Fitzek, 1997, p. 46).

HERMANN VON HELMHOLTZ

Many consider **Hermann von Helmholtz (1821–1894)** to be the premier scientist of the 19th century. As we will see, he made significant contributions in physics, physiology, and psychology. Helmholtz, born in Potsdam, Germany, was a frail child and a mediocre student who was especially poor at foreign languages and poetry. Helmholtz's apparent mediocrity as a student, however, seemed to reflect the inadequacy of his teachers because he spent his spare time reading scientific books and working out the geometrical principles that described the various configurations of his play blocks. His father was a teacher who did not have enough money to pay for the scientific training that his son desired. Fortunately, the government had a program under which talented students could go to medical school free if they agreed to serve for eight years as army surgeons following graduation. Helmholtz took advantage of this program and enrolled in the Berlin Royal Friedrich-Wilhelm Institute for Medicine and Surgery when he was 17 years old. While in his second year of medical school, he began his studies with Johannes Müller.

Helmholtz's Stand against Vitalism

Although Helmholtz accepted many of Müller's conclusions, the two men still had basic disagreements, one of them over Müller's belief in vitalism. In biology and physiology, the vitalism-materialism problem was much like the mind–body problem in philosophy and psychology. The vitalists maintained that life could not be explained by the interactions of physical and chemical processes alone. For the vitalists, life was more than a physical process and could not be reduced to such a process. Furthermore, because it was not physical, the "life force" was forever beyond the scope of scientific analysis. Müller was a vitalist. Conversely, the materialists saw nothing mysterious about life and assumed that it could be explained in terms of physical and chemical processes. Therefore, there was no reason to exclude the study of life or of anything else from the realm of science. Helmholtz sided with the materialists, who believed that the same laws apply to living and nonliving things, as well as to mental and nonmental events. So strongly did Helmholtz and several of his fellow students believe in materialism that they signed the following oath (some say in their own blood):

> No other forces than the common physical-chemical ones are active within the organism. In those cases which cannot at the time be explained by these forces one has either to find the specific way or form of their action by means of the physical mathematical method, or to assume new forces equal in dignity to the physical-chemical forces inherent in matter, reducible to the force of attraction and repulsion. (Bernfeld, 1949, p. 171)

In addition to Helmholtz, others who signed the oath were Du Bois-Reymond (who became the professor of physiology at the University of Berlin when Müller died), Karl Ludwig (who became a professor of physiology at the University of Leipzig, where he influenced a young Ivan Pavlov), and Ernst Brucke (who became a professor of physiology at the University of Vienna, where he taught and befriended Sigmund Freud). What this group accepted when they rejected vitalism were the beliefs that living organisms, including humans, were complex machines (mechanism) and that these machines consist of nothing but material substances (materialism). The mechanistic-materialistic philosophy embraced by these individuals profoundly influenced physiology, medicine, and psychology.

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Principle of Conservation of Energy. Helmholtz obtained his medical degree at the age of 21 and was inducted into the army. While in the army, he was able to build a small laboratory and to continue his early research, which concerned metabolic processes in the frog. Helmholtz demonstrated that food and oxygen consumption were able to account for the total energy that an organism expended. He was thus able to apply the already popular **principle of conservation of energy** to living organisms. According to this principle, which previously had been applied to physical phenomena, energy is never created or lost in a system but is only transformed from one form to another. When applied to living organisms, the principle was clearly in accordance with the materialist philosophy because it brought physics, chemistry, and physiology closer together. In 1847 Helmholtz published a paper titled "The Conservation of Force," and it was so influential that he was released from the remainder of his tour of duty in the army.

In 1848 Helmholtz was appointed lecturer of anatomy at the Academy of Arts in Berlin. The following year, he was appointed professor of physiology at Konigsberg, where Kant had spent his entire academic life. It was at Konigsberg that Helmholtz conducted his now famous research on the speed of nerve conduction.

Hermann von Helmholtz

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Rate of Nerve Conduction

Müller maintained that nerve conduction was almost instantaneous, making it too fast to measure. This view reflected his belief that there was a vital, nonmaterial, agent that moved instantaneously and determined the behavior of living organisms. Those believing in such a vital force never considered measuring the speed of nerve conduction.

Helmholtz, however, excluded nothing from the realm of science, not even the rate of nerve conduction. To measure the rate, Helmholtz isolated the nerve fiber leading to a frog's leg muscle. He then stimulated the nerve fiber at various distances from the muscle and noted how long it took the muscle to respond. He found that the muscular response followed more quickly when the motor nerve was stimulated closer to the muscle than when it was stimulated farther away from the muscle. By subtracting one reaction time from the other, he concluded that the nerve impulse travels at a rate of about 90 feet per second (27.4 meters per second). Helmholtz then turned to humans, asking his subjects to respond by pushing a button when they felt their leg being stimulated. He found that reaction time was slower when the toe was stimulated than when the thigh was stimulated; he concluded, again by subtraction, that the rate of nerve conduction in humans was between 165 and 330 feet per second (50.3–100.6 meters per second). This aspect of Helmholtz's research was significant because it showed that nerve impulses are indeed measurable—and, in fact, they are relatively slow. This was taken as further evidence that physical-chemical processes are involved in our interactions with the environment instead of some mysterious process that was immune to scientific scrutiny.

Although the measure of reaction time was extremely useful to Helmholtz in measuring the speed of nerve conduction, he found that it varied considerably among subjects and even for the same subject at different times. He concluded that reaction time was too unreliable to be used as a valid

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measure and abandoned it. Support for his doubts came later when more precise measurements made by Du Bois-Reymond indicated that the nerve conduction speeds he had reported were too slow. But this does not detract from the importance of Helmholtz's pioneering research.

Theory of Perception

Although he believed that the physiological apparatus of the body provides the mechanisms for sensation, Helmholtz thought that the past experience of the observer is what converts a **sensation** into a **perception**. Sensations, then, are the raw elements of conscious experience, and perceptions are sensations after they are given meaning by one's past experiences. In explaining the transformation of sensations into perceptions, Helmholtz relied heavily on the notion of **unconscious inference**. According to Helmholtz, to label a visual experience a "chair" involves applying a great deal of previous experience, as does looking at railroad tracks converging in the distance and insisting that they are parallel. Similarly, we see moving pictures as moving because of our prior experience with events that create a series of images across the retina. And we learn from experience that perceived distance is inversely related to the size of the retinal image. Helmholtz decided that the perception of depth arises because the retinal image an object causes is slightly different on the two retinas. Previous experience with such retinal disparity causes the unconscious inference of depth. Helmholtz was reluctant to use the term *unconscious inference* because it suggested the type of mysterious process that would violate his oath, but he could not find a better term.

Helmholtz supported his empirical theory of perception with the observation that individuals who are blind at birth and then acquire sight need to learn to perceive, even though all the sensations furnished by the visual apparatus are available. His classic experiments with lenses that distorted vision provided further evidence. Helmholtz had subjects wear lenses that displaced the visual field several inches to the right or left. At first, the subjects would make mistakes in reaching for objects; but after several minutes *perceptual adaptation* occurred, and even while wearing the glasses, the subjects could again interact accurately with the environment. When the glasses were removed, the subjects again made mistakes for a short time but soon recovered.

Helmholtz took several innate categories of thought Kant had proposed and showed how they were derived from experience. Helmholtz and Kant agreed on one important point: The perceiver transforms what the senses provide. For Kant this transformation was accomplished when sensory information was structured by the innate faculties of the mind. For Helmholtz, the transformation occurred when sensory information was embellished by an individual's past experience. With his notion of unconscious inference, Helmholtz came very close to what would later be considered part of psychology. That is, for unconscious inference to convert a sensation into a perception, memories of previous learning experiences must interact with current sensations. Although the processes of learning and memory were later to become central to psychology, Helmholtz never considered himself a psychologist. He believed that psychology was too closely allied with metaphysics, and he wanted nothing to do with metaphysics.

Theory of Color Vision. Helmholtz performed his work on vision between 1853 and 1868 at the Universities of Konigsberg, Bonn, and Heidelberg, and he published his results in the three-volume *Handbook of Physiological Optics* (1856–1866). Many years before Helmholtz's birth, Thomas Young (1773–1829) had proposed a theory of color vision very similar to Helmholtz's, but Young's theory had not been widely accepted. Helmholtz changed Young's theory slightly and buttressed it with experimental evidence. The theory we present here has come to be called the **Young–Helmholtz theory of color vision** (also called the trichromatic theory).

In 1672 Newton had shown that if white sunlight was passed through a prism, it emerged as a band of colored lights with red on one end of the band, then orange, yellow, green, blue, indigo, and, finally, violet. The prism separated the various wavelengths that together were experienced as white. Early

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speculation was that a different wavelength corresponded to each color and that different color experiences resulted from experiencing different wavelengths. However, Newton himself saw difficulties with this explanation. When he mixed various wavelengths, it became clear to him that the property of color was not in the wavelengths themselves but in the observer. For example, white is experienced either if all wavelengths of the spectrum are present or if wavelengths corresponding to the colors red and blue-green are combined. Similarly, a person cannot distinguish the sensation of orange caused by the single wavelength corresponding to orange from the sensation of orange caused by mixing red and yellow. The question was how to account for the lack of correspondence between the physical stimuli present and the sensations they cause.

Helmholtz's answer was to expand Müller's doctrine of specific nerve energies by postulating three different types of color receptors on the retina. That is, instead of saying that color vision had one specific nerve energy associated with it, as Müller had thought, Helmholtz claimed it involved three separate receptors, each with its own specific energy. It was already known that various combinations of three colors—red, green, and blue-violet, the additive primary colors—could produce all other colors. Helmholtz speculated that there are three types of color receptors corresponding to the three primary colors. If a red light is shown, the so-called red receptors are stimulated, and one has the sensation of red; if a green light is shown, the green receptors are stimulated, and one has the experience of green; and so on. If all these primaries are shown at once, one experiences white. If the color shown is not a primary color, it would stimulate various combinations of the three receptors, resulting in a subjective color experience corresponding to the combination of wavelengths present. For example, presenting a red and a green light simultaneously would produce the subjective color experience of yellow. Also, the same color experience could be caused by several different patterns of the three receptor systems firing. In this way, Helmholtz explained why many physical wavelengths give rise to the same color experience.

The Young–Helmholtz theory of color vision was extremely helpful in explaining many forms of color blindness. For example, if a person lacks one or more of the receptor systems corresponding to the primary colors, he or she will not be able to experience certain colors subjectively, even though the physical world has not changed. The senses therefore actualize elements of the physical world that otherwise exist only as potential experiences.

Helmholtz was continually amazed at the way physiological mechanisms distort the information a person receives from the physical world, but he was even more amazed at the mismatch between physical events and psychological sensations (such as the experience of color). Helmholtz expressed his feelings as follows:

> The inaccuracies and imperfections of the eye as an optical instrument, and the deficiencies of the image on the retina, now appear insignificant in comparison with the incongruities we have met with in the field of sensation. One might almost believe that Nature had here contradicted herself on purpose in order to destroy any dream of a preexisting harmony between the outer and the inner world. (Kahl, 1971, p. 192)

Theory of Auditory Perception

For audition, as he had done for color vision, Helmholtz further refined Müller's doctrine of specific nerve energies. He found that the ear is not a single sense receptor but a highly complex system of many receptors. Whereas the visual system consists of three types of nerve fibers, each with its own specific nerve energy, the auditory system contains thousands of types of nerve fibers, each with its own specific nerve energy. Helmholtz found that when the main membrane of the inner ear, the basilar membrane, was removed and uncoiled, it was shaped much like a harp. Assuming that this membrane is to hearing what the retina is to seeing, Helmholtz speculated that the different fibers along the basilar membrane are sensitive to differences in the frequency of sound waves. The short fibers

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respond to the higher frequencies, the longer fibers to the lower frequencies. A wave of a certain frequency causes the appropriate fiber of the basilar membrane to vibrate, thus causing the sensation of sound corresponding to that frequency. This process was called sympathetic vibration, and it can be demonstrated by stimulating a tuning fork of a certain frequency and noting that the string on a piano corresponding to that frequency also begins to vibrate. Helmholtz assumed that a similar process occurs in the middle ear and that, through various combinations of fiber stimulation, one could explain the wide variety of auditory experiences we have. This theory is referred to as the **resonance place theory of auditory perception**. Variations of Helmholtz's place theory persist today.

Helmholtz's Contributions

Although Helmholtz was an empiricist in his explanations of sensation and perception, he did reflect the German Zeitgeist by postulating an active mind. According to Helmholtz, the mind's task was to create a reasonably accurate conception of reality from the various "signs" that it receives from the body's sensory systems. Helmholtz assumed that a dynamic relationship exists among volition, sensation, and reflection as the mind attempts to create a functional view of external reality. Helmholtz's view of the mind differed from that of most of the British empiricists and French sensationalists because they saw the mind as largely passive. For Helmholtz the mind's job was to construct a workable conception of reality given the incomplete and perhaps distorted information furnished by the senses (Turner, 1977).

Although Helmholtz did postulate an active mind, he accepted the empirical explanation of the origins of the contents of that mind. In his explanations of sensation (the mental event that results from sensory stimulation) and perception (sensation plus unconscious inference), Helmholtz was emphatically empirical and unequivocally scientific. He showed that nerve transmission is not instantaneous, as had previously been believed, but that it is rather slow and reflects the operation of physical processes. More than anyone before him, Helmholtz showed with experimental rigor the mechanisms by which we do commerce with the physical world—mechanisms that could be explained in terms of objective, physical laws. Although he found that the match between what is physically present and what is experienced psychologically is not perfect, he could explain the discrepancy in terms of the properties of the receptor systems and the unconscious inferences of the observer. No mystical, unscientific forces were involved. Helmholtz's work brought physics, chemistry, physiology, and psychology closer together. In so doing, it paved the way for the emergence of experimental psychology, which was in many ways an inevitable step after Helmholtz's work. For an excellent discussion of Helmholtz's contributions to modern science and of the cultural climate in which they were made, see Cahan (1994).

Helmholtz realized a lifelong ambition when he was appointed professor of physics at the University of Berlin in 1871. In 1882 the German emperor granted him noble status, and thereafter his name was Hermann von Helmholtz. In 1893 Helmholtz came to the United States to see the Chicago World's Fair and to visit with William James. On his way back to Germany, he fell aboard ship and suffered cuts and bruises but was apparently not badly injured. Following the accident, however, he complained of a general lack of energy. The next year he suffered a cerebral hemorrhage and died on September 8, 1894.

EWALD HERING

Helmholtz, with his notion of unconscious inference, generally sided with those who said perceptions were learned. **Ewald Hering (1834–1918)** sided with the nativists. After receiving his medical degree from the University of Leipzig, Hering stayed there for several years before accepting a post as lecturer at the Vienna Military Medical Academy, where he worked with Josef Breuer (1842–1925), who was later to be instrumental in the founding of psychoanalysis (see Chapter 16). Working together, Hering and Breuer showed that respiration was, in part, caused by receptors in the lungs—a finding called the Hering-Breuer reflex. In 1870 Hering was called to the University of Prague, where he succeeded the great physiologist Jan E. Purkinje (1787–1869). Like Goethe, to whom Purkinje dedicated one of his major works, Purkinje was a phenomenologist. He believed that the phenomena of the mind, arrived at by careful introspective analysis, should be what physiologists attempt to explain. According to Purkinje, the physiologist is obliged to explain not only "normal" sensations and perceptions but "abnormal" ones as well, such as illusions and afterimages. Among the many phenomena that Purkinje observed was that the relative vividness of colors is different in faint light than it is in bright light. More specifically, as twilight approaches, hues that correspond to short wavelengths such as violet and blue appear brighter than hues corresponding to longer wavelengths such as yellow and red. This change in relative vividness, as a function of luminance level, is known as the Purkinje shift. Hering also was a phenomenologist, and his theory of color vision, was based to a large extent on the phenomenon of negative afterimages.

Space Perception and Color Vision

On the matter of space perception, we have seen that Helmholtz believed that it slowly develops from experience as physiological and psychological events are correlated. Hering, however, believed that, when stimulated, each point on the retina automatically provides three types of information about the stimulus: height, left-right position, and depth. Following Kant, Hering believed that space perception exists a priori. For Kant, space perception was an innate category of the mind; for Hering, it was an innate characteristic of the eye. This controversy about perception became the Helmholtz-Hering debate, and in various guises continues even today.

After working on the problem of space perception for about 10 years, Hering turned to color vision. Hering observed a number of phenomena that he believed either were incompatible with the Young–Helmholtz theory or could not be explained by it. He noted that certain pairs of colors, when mixed together, give the sensation of gray. This was true for red and green, blue and yellow, and black and white. He also observed that a person who stares at red and then looks away experiences a green afterimage; similarly, blue gives a yellow afterimage. Hering also noted that individuals who have difficulty distinguishing red from green could still see yellow; also, it is typical for a color-blind person to lose the sensation of *both* red and green, not just one or the other. All these observations at least posed problems for the Young–Helmholtz theory, if they did not contradict it.

To account for these phenomena, Hering theorized that there are three types of receptors on the retina but that each could respond in two ways. One type of receptor responds to red-green, one type to yellow-blue, and one type to black-white. Red, yellow, and white cause a "tearing down," or a *catabolic process*, in their respective receptors. Green, blue, and black cause a "building up," or an *anabolic process*, in their respective receptors. If both colors to which a receptor is sensitive are experienced simultaneously, the catabolic and anabolic processes are

Ewald Hering

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canceled out, and the sensation of gray results. If one color to which a receptor is sensitive is experienced, its corresponding process is depleted, leaving only its opposite to produce an afterimage. Finally, Hering's theory explained why individuals who cannot respond to red or green can still see yellow and why the inability to see red is usually accompanied by an inability to see green.

For nearly 50 years, lively debate ensued between those accepting the Young–Helmholtz theory and those accepting Hering's; the matter is still far from settled. The current view is that the Young–Helmholtz theory is correct in that there are retinal cells sensitive to red, green, and blue but that there are neural processes beyond the retina that are more in accordance with Hering's proposed metabolic processes.

CHRISTINE LADD-FRANKLIN

Throughout Western history, neither philosophy nor science has been common vocations for women. In both ancient Egypt and Greece there were some famous women physicians, but we know little beyond their names. Educational opportunities were rare for most everyone in medieval Europe, but especially for women. The extensive writings by Hildegard of Bingen (died 1179) is often cited as a lone notable exception. With the advent of printing in the Renaissance, education and literacy again was on the rise—even for women. By the 1700s and 1800s, a few women were gaining modest recognition in philosophy and science. For example, the Italian Laura Bassi (1711–1778) is thought to have been the first female university professor. As psychology finally found its place among the academic sciences, so too did women.

Christine Ladd (1847–1930) graduated from the then new Vassar College in 1869. She pursued her interest in mathematics at the also new Johns Hopkins University and, although she completed all the requirements for a doctorate in 1882, the degree was not granted because she was a woman. She was, however, given an honorary degree by Vassar in 1887. When the social climate became less discriminating against women, she was granted her doctorate from Johns Hopkins in 1926, 44 years after she had completed her graduate work (she was nearly 80 years old at the time).

In 1882 Christine Ladd married Fabian Franklin, a mathematics professor at Johns Hopkins. During her husband's sabbatical leave in Germany, **Christine Ladd-Franklin** was able to pursue an interest in psychology she had developed earlier (she had published a paper on vision in 1887). Although, at the time, women were generally excluded from German universities, she managed to be accepted for a year (1891–1892) in Georg E. Müller's laboratory at Göttingen, where Hering's theory of color vision was supported. After her year under Müller's influence, she studied with Helmholtz at the University of Berlin, where she learned about his trichromatic theory of color vision.

Before leaving Europe, Ladd-Franklin was ready to announce her own theory of color vision, which she believed improved upon those of Helmholtz and Hering. She presented her theory at the International Congress of Experimental Psychology in London in 1892. Upon returning to the United States, Ladd-Franklin lectured on logic and psychology at Johns Hopkins until she and her husband moved to New York, where she lectured and promoted her theory of color vision at Columbia University from 1910 until her death in 1930.

Ladd-Franklin's theory of color vision was based on evolutionary theory. She noted that some animals are color blind and assumed that achromatic vision appeared first in evolution and color vision came later. She assumed further that the human eye carries vestiges of its earlier evolutionary development. She observed that the most highly evolved part of the eye is the fovea, where, at least in daylight, visual acuity and color sensitivity are greatest. Moving from the fovea to the periphery of the retina, acuity is reduced and the ability to distinguish colors is lost. However, in the periphery of the retina, night vision and movement perception are better than in the fovea. Ladd-Franklin assumed that peripheral vision (provided by the rods of the retina) was more primitive than foveal vision (provided by the cones of the retina) because

Christine Ladd-Franklin

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night vision and movement detection are crucial for survival. But if color vision evolved later than achromatic vision, was it not possible that color vision itself evolved in progressive stages?

After carefully studying the established color zones on the retina and the facts of color blindness, Ladd-Franklin concluded that color vision evolved in three stages. Achromatic vision came first, then blue-yellow sensitivity, and finally red-green sensitivity. The assumption that the last to evolve would be the most fragile explains the prevalence of red-green color blindness. Blue-yellow color blindness is less frequent because it evolved earlier and is less likely to be defective. Achromatic vision is the oldest and therefore the most difficult to disrupt.

Ladd-Franklin, of course, was aware of Helmholtz's and Hering's theories, and, although she preferred Hering's theory, her theory was not offered in opposition to either. Rather, she attempted to explain in evolutionary terms the origins of the anatomy of the eye and its visual abilities.

After initial popularity, Ladd-Franklin's theory fell into neglect, perhaps because she did not have adequate research facilities available to her. Some believe, however, that her analysis of color vision still has validity (see, for example, Hurvich, 1971). For interesting biographical sketches of Ladd-Franklin, see Furumoto (1992) and Scarborough and Furumoto (1987).

EARLY RESEARCH ON BRAIN FUNCTIONING

Toward the end of the 18th century, it was widely believed that a person's character could be determined by analyzing his or her facial features, body structure, and habitual patterns of posture and movement. Such an analysis was called **physiognomy** (Jahnke, 1997). One version of physiognomy that became extremely popular was phrenology.

Phrenology

Not long after Reid and company (see Chapter 6) had listed what they thought were the faculties of the mind, others were to take faculty psychology in to the realm of physiology. One was **Franz Joseph Gall (1758–1828)**. Gall accepted the widely held belief that faculties of the mind acted on and transformed sensory information, but he made three additional claims that changed the history of faculty psychology:

- The mental faculties do not exist to the same extent in all humans.
- The faculties are housed in specific areas of the brain.
- If a faculty is well developed, a person would have a bump or protrusion on the corresponding part of the skull. Similarly, if a faculty is underdeveloped, a hollow or depression would be on the corresponding part of the skull.

Thus, Gall believed that the magnitude of one's faculties could be determined by examining the bumps and depressions on one's skull. Such an analysis was called **phrenology**. Gall's idea was not necessarily a bad one. In fact, Gall was among the first to attempt to relate certain personality traits and overt behavior patterns to specific brain functions. The problem was the type of evidence he accepted to demonstrate this relationship. He would observe that someone had a pronounced personality characteristic and a well-developed brain structure and then attribute one to the other. After observing such a

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Courtesy of the National Library of Medicine

Franz Joseph Gall

relationship in one individual, he would generalize it to all individuals. In their research on the mental faculties, some of Gall's followers exceeded even his shoddiness:

> If *Gall* was cavalier in his interpretations of evidence, he attracted some followers who raised that tendency to an art form. When a cast of Napoleon's right skull predicted qualities markedly at variance with the emperor's known personality, one phrenologist replied that his dominant side had been the left—a cast of which was conveniently missing. When Descartes's skull was examined and found deficient in the regions for reason and reflection, phrenologists retorted that the philosopher's rationality had always been overrated. (Fancher, 1990, p. 79)

Although Gall is usually reviewed negatively in the history of psychology, he made several positive contributions to the study of brain functioning. For example, he studied the brains of several animal species, including humans, and was the first to suggest a relationship between cortical development and mental functioning. He found that larger, better-developed cortices were associated with more intelligent behavior. In addition, he was the first to distinguish the functions of gray matter and white matter in the brain. These discoveries alone qualify Gall for recognition in the history of psychology, but there is more. As the 19th century began, the idea that different cortical regions are associated with different functions was becoming popular. This, in large part, was due to Gall: "In the minds of most historians, Gall, more than any other scientist, put the concept of cortical localization into play" (Finger, 1994, p. 32).

The Popularity of Phrenology. The term *phrenology* was actually coined by Thomas Foster in 1815 (Bakan, 1966). Gall rejected the term (he preferred *physiognomy*), but it was accepted and made popular by his student and colleague **Johann Kaspar Spurzheim (1776–1832)**. The dissemination of phrenology into English-speaking countries was facilitated by Spurzheim's *The Physiognomical System of Drs. Gall and Spurzheim* (1815) and by the translation of Gall's *On the Functions of the Brain and Each of Its Parts: With Observations on the Possibility of Determining the Instincts, Propensities, and Talents, or the Moral and Intellectual Dispositions of Men and Animals, by the Configuration of the Brain and Head* (1835).

Phrenology became enormously popular and was embraced by some of the leading intellectuals in Europe (such as Bain and Comte). One reason for the popularity of phrenology was Gall's considerable reputation. Another was that phrenology provided hope for an objective, materialistic analysis of the mind: "The central theme that runs through all of the phrenological writings is that man himself could be studied scientifically, and in particular that the phenomena of mind could be studied objectively and explained in terms of natural causes" (Bakan, 1966, p. 208).

Phrenology was also popular because, unlike mental philosophy, it appeared to offer practical information. For these reasons phrenology was also embraced enthusiastically in the United States. For example, the Central Phrenological Society was founded in Philadelphia in 1822 by Charles Caldwell (1772–1853). In 1824 Caldwell published *Elements of Phrenology*, the first American textbook on phrenology. In 1827 a second edition of *Elements* was published. Because of the popularity of phrenology, when Spurzheim arrived in the

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United States on August 4, 1832, he was given a hero's welcome. He lectured at some of the nation's leading universities, such as Harvard and Yale, and his appreciative audiences included physicians, ministers, public educators, college professors, and asylum superintendents. O'Donnell (1985) points out that these and other individuals were looking to phrenology for the type of information that some would later seek in the school of behaviorism (see Chapter 12):

> With or without bumps, phrenology's theory of human nature and personality recommended itself to emerging professional groups searching for "positive knowledge." … [They] found in phrenology an etiological explanation of aberrant human behavior; a predictive technology for assessing character, temperament, and intellect; and a biological blueprint for social reform. The social engineers of the twentieth century, together with their patrons and subscribers, would demand no less of modern experimental behaviorism. When the new psychology [behaviorism] arrived on the American stage an eager audience anticipated the role it was to play. Gall, Spurzheim … and their followers had already written the script. (p. 78)

Spurzheim died shortly after he came to the United States, and on the day of his funeral (November 17, 1832), the Boston Phrenological Society was formed. Such societies soon sprang up all over the nation (Bakan, 1966), and numerous journals devoted to phrenology emerged in Europe and the United States. One, *Phrenological Journal*, started publishing in 1837 and continued until 1911. In New York, the Fowler brothers and then their extended family ran the Institute of Phrenology from the 1830s until 1912. They published popular texts and provided services akin to those offered by modern industrial/organizational (and counseling) psychologists.

A number of "phrenology charts" began to appear after the publication of Gall's and Spurzheim's books. Proposed numbers of faculties ranged from 27 (suggested by Gall) to as many as 43 suggested by later phrenologists. Figure 8.1 shows the chart Spurzheim proposed.

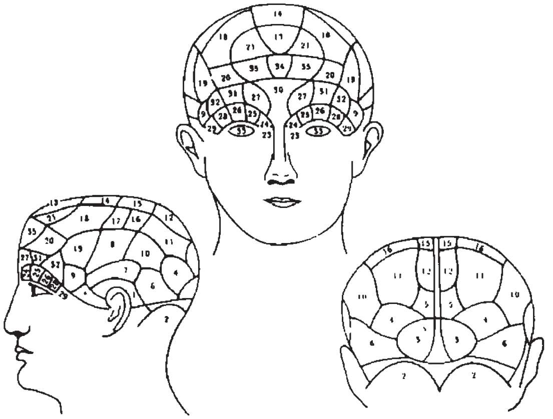
Formal Discipline. Phrenology also became highly influential in the realm of education. Several phrenologists made the additional claim that the faculties become stronger with practice, just as muscles do. This belief influenced a number of educators to take a "mental muscle" approach to education. For them education meant strengthening mental faculties by practicing the traits associated with them. One could improve one's reasoning ability, for example, by studying mathematics. The belief that educational experiences could be arranged so that they strengthen certain faculties was called **formal discipline**. Although Edward L. Thorndike systematically evaluated the educational claims of the phrenologists and found them to be false (see Chapter 11), the belief that educational experiences can be arranged to strengthen specific mental faculties persists to the present.

In time, the specific claims of the phrenologists were rejected, but phrenology did influence subsequent psychology in a number of important ways: It argued effectively that the mind and brain are closely related; it stimulated intense research on the localization of brain functions; and it showed the importance of furnishing practical information.

In other forms physiognomy itself endured well into the 20th century. William H. Sheldon (1898–1977) was the godson of William James, and following the completion of both his MD and PhD degrees, he studied with Jung and Freud. Later, at Harvard, he became famous for correlating personality with body form. Although eventually reinterpreted by his critics (for example, Eysenck, 1959), Sheldon was able to find significant personality differences between thin and angular ectomorphs, lean and muscular mesomorphs, and soft and round mesomorphs.

Pierre Flourens

By the turn of the 19th century, it was generally conceded that the brain is the organ of the mind.



Affective Faculties

Propensities
? Desire to live
• Alimentiveness
1 Destructiveness
2 Amativeness
3 Philoprogenitiveness
4 Adhesiveness
5 Inhabitiveness
6 Combativeness
7 Secretiveness
8 Acquisitiveness
9 Constructiveness

Sentiments
10 Cautiousness
11 Approbativeness
12 Self-Esteem
13 Benevolence
14 Reverence
15 Firmness
16 Conscientiousness
17 Hope
18 Marvelousness
19 Ideality
20 Mirthfulness
21 Imitation

Intellectual Faculties

Perceptive
22 Individuality
23 Configuration
24 Size
25 Weight and resistance
26 Coloring
27 Locality
28 Order
29 Calculation
30 Eventuality
31 Time
32 Tune
33 Language

Reflective
34 Comparison
35 Causality

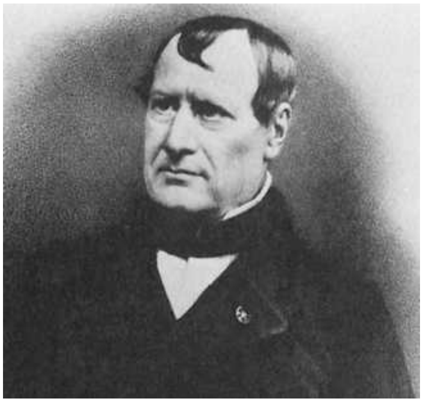
FIGURE 8.1

The phrenology chart suggested by Spurzheim (1834) showing the "powers and organs of the mind."

Under the influence of Gall and the other phrenologists, the brain-mind relationship was articulated into a number of faculties housed in specific locations in the brain. Thus, the phrenologists fueled the concern of localization of functions in the brain. Although popular (even among scientists), phrenology was far from universally accepted. A number of prominent physicians questioned the claims of the phrenologists. It was not enough, however, to claim that the phrenologists were wrong in their assumptions; the claim had to be substantiated scientifically. This was the goal of **Pierre Flourens (1794–1867)**, who used the method of extirpation, or ablation, in brain research.

Ablation involves destroying part of the brain and then noting the behavioral consequences of the loss. As did Gall, Flourens assumed that the brains of lower animals were similar in many ways to human brains, so he used organisms such as dogs and pigeons as his research subjects. He found that removal of the cerebellum disturbed an organism's coordination and equilibrium, that ablation of the cerebrum resulted in passivity, and that destruction of the semicircular canals resulted in loss of balance.

When he examined the entire brain, Flourens concluded that there is some localization, but that contrary to what the phrenologists believed, the cortical hemispheres function as a unit. Seeking further evidence of the brain's interrelatedness,



Courtesy of the National Library of Medicine

Pierre Flourens

Flourens observed that animals sometimes regained functions that they had lost following ablation. Thus, at least some parts of the brain had the capacity to take over the function for other parts. Flourens's fame as a scientist, and his conclusion that the cortex functioned as a unit, effectively silenced the phrenologists within the medical community. Subsequent research, however, would show that they had been silenced too quickly.

Paul Broca

On September 13, 1848, Phineas Gage was working as a railroad construction supervisor when an explosion blew an iron tamping rod through his skull. As shown in Figure 8.2, the sizeable rod entered just below his left eye and exited through the top of his head. Amazingly, not only did Gage survive the accident, but fully recovered physically. What was changed, however, was Gage's personality. Dr. John Harlow (1868) observed:

> He is fitful, irreverent, indulging at times in the grossest profanity (which was not previously his custom), manifesting but little deference for his fellows, impatient of restraint or advice when it conflicts with his desires, at times pertinaciously obstinate, yet capricious and vacillating, devising many plans of future operation, which are no sooner arranged than they are abandoned.… His friends and acquaintances said he was "no longer Gage." (pp. 339–340)

Modern work based on Gage's skull and Harlow's observations (Damasio, Grabowski, Frank, Galabruda, & Damasio, 1994) have linked the ablated areas of the brain with corresponding expected behavioral changes. Another person to make such postmortem correlations was **Paul Broca (1824–1880)**.

Using the **clinical method**, Broca cast doubt on Flourens's conclusion that the cortex acted as a whole. Boring (1950) described Broca's observation:

> Broca's famous observation was in itself very simple. There had in 1831 been admitted at the Bicetre, an insane hospital near Paris, a man whose sole defect seemed to be that he could not talk. He communicated intelligently by signs and was otherwise mentally normal. He remained at the Bicetre for thirty years with this defect and on April 12, 1861, was put under the care of Broca, the surgeon, because of a gangrenous infection. Broca for five days subjected him to a careful examination, in which he satisfied himself that the musculature of the larynx and articulatory organs was not hindered in normal movements, that there was no other paralysis that could interfere with speech, and that the man was intelligent enough to speak. On April 17 the patient—fortunately, it must have seemed, for science—died; and within a day Broca had performed an autopsy, discovering a lesion in the third frontal convolution of the left cerebral hemisphere, and had presented the brain in alcohol to the Societe d'Anthropologie. (p. 71)

Actually, even Broca was not the first to suggest that clinical observations be made and then to use autopsy examinations to locate a brain area responsible for a disorder. For example, the French scientist Jean-Baptiste Bouillaud (1796–1881) had done so as early as 1825. Using the clinical method on a large number of cases, Bouillaud reached essentially the same conclusion concerning the

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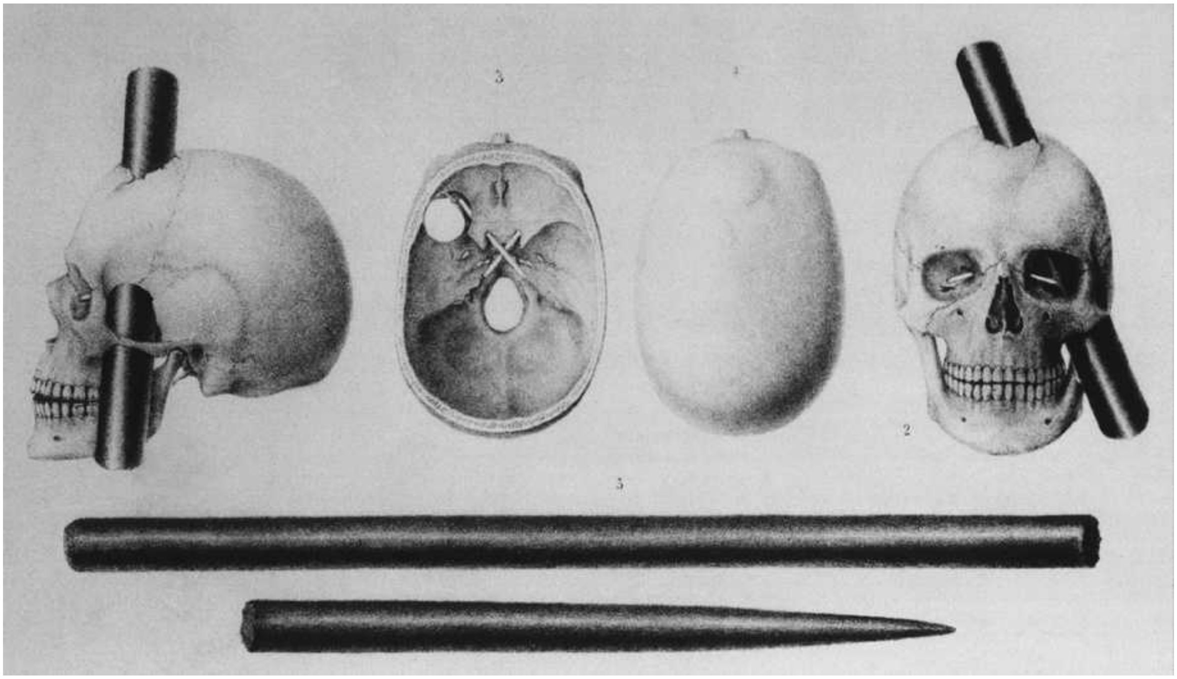

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FIGURE 8.2

The skull of Phineas Gage.

localization of a speech area on the cortex that Broca was to reach later using the same technique. Why, then, do we credit Broca with providing the first credible evidence for cortical localization and not Bouillaud? It is primarily because Bouillaud had been closely associated with phrenology and, by the time that Broca made his observations, "The scientific community [was] overly cautious about anything or anyone associated in any way with Gall or phrenology" (Finger, 1994, p. 37).

In any case, subsequent research confirmed Broca's observation that a portion of the left cortical hemisphere is implicated in speech articulation or production, and this area has been named **Broca's area**. In 1874, just over a decade after Broca's discovery, the German neurologist **Carl Wernicke (1848–1905)** discovered a cortical area, near Broca's area, responsible for speech comprehension. This area on the left temporal lobe of the cortex has been named **Wernicke's area**.

Broca's localizing of a function on the cortex supported the phrenologists and damaged Flourens's contention that the cortex acted as a unit. Unfortunately for the phrenologists, however, Broca did not find the speech area to be where the phrenologists had said it would be.

Other aspects of Broca's work were less impressive. Reflecting the Zeitgeist, he engaged in craniometry (the measurement of the skull and its characteristics) in order to determine the relationship between brain size and intelligence. He began his research with a strong conviction that there was such a relationship, and (not surprisingly) he found evidence for it. In 1861 Broca summarized his findings:

> In general, the brain is larger in mature adults than in the elderly, in men than in women, in eminent men than in men of mediocre talent, in superior races than in inferior races.… Other things equal, there is a remarkable relationship between the development of intelligence and the volume of the brain. (Gould, 1981, p. 83)

Broca was aware of several facts that contradicted his theory: There existed an abundance of

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Courtesy of the National Library of Medicine

Paul Broca

large-brained criminals, highly intelligent women, and small-brained people of eminence; and Asians, despite their smaller average brain size, were generally more intelligent than ethnic groups with larger brains. In spite of these contradictions, and in the absence of reliable, supportive evidence, Broca continued to believe in the relationship between brain size and intelligence until his death. Then it was discovered that his brain weighed 1,424 grams: "A bit above average to be sure, but nothing to crow about" (Gould, 1981, p. 92).

So what is the relationship between brain size and intelligence? Deary (2001) first reviews the contemporary research on the topic and then concludes, "There is a modest association between brain size and … intelligence. People with bigger brains tend to have higher mental test scores. We do not know yet why this association occurs" (p. 45). Thus, it appears that Broca and other craniometricians were not totally wrong. However, their claims far exceeded their evidence. As we will see in Chapter 10, the tendency to "scientifically" confirm personal beliefs concerning intelligence continued even when measures of intelligence became more sophisticated.

Electrophysiology: Fritsch and Hitzig

The 18th century has often been called the Age of Electricity, and scientist's fascination with electricity soon extended into physiology. In the late 1700s Luigi Galvani (1737–1798) demonstrated that application of an electrical current caused a frog's leg to twitch. Emil Du Bois-Reymond, who we have mentioned several times previously, was considered the "father of electrophysiology" in part for demonstrating the electrical basis of the action potential in nerves and muscles.

Electrically stimulating the exposed cortex of a dog, **Gustav Fritsch (1838–1927)** and **Eduard Hitzig (1838–1907)** made two important discoveries. First, the cortex is not insensitive, as had been previously assumed. Second, they found that when a certain area of the cortex is stimulated, muscular movements are elicited from the opposite side of the body. Stimulating different points in this *motor area* of the brain stimulated movements from different parts of the body. Thus, another function was localized on the cortex.

David Ferrier. **David Ferrier (1843–1928)** refined the cortical research performed by Fritsch and Hitzig. Using monkeys as subjects and finer electrical stimulation, he was able to produce a more articulated map of the motor cortex. He was able to elicit behaviors "as intricate as the twitch of an eyelid, the flick of an ear, and the movement of one digit" (Finger, 1994, p. 40). Ferrier then mapped cortical regions corresponding to the cutaneous senses, audition, olfaction, and, eventually, vision. He summarized his findings in *The Functions of the Brain* (1876) which had a substantial impact on the scientific community: "One outcome was that it opened the 'modern' era of neurosurgery. Neurosurgeons now turned to 'functional maps' of the brain for guidance" (Finger, 1994, p. 41).

The evidence seemed clear; there is a great deal of localization of function on the cortex, just as the phrenologists had maintained. These findings, however, did not support traditional phrenology. Seldom was a function (faculty) found where the phrenologists had said it was. Furthermore, the phrenologists had spoken of faculties such as vitality, firmness, love, and kindness, but the researchers instead found sensory and motor areas. These findings extended the Bell-Magendie law to the brain. That is, the sensation experienced seemed to be more a matter of the cortical area stimulated than a matter of the sensory nerve stimulated. It looked very much as if the brain is a complex switchboard where sensory information is projected and where it in turn stimulates appropriate motor responses.

The brain research that was stimulated in an effort to evaluate the claims of the phrenologists made it clear that physical stimulation gives rise to various types of subjective experiences and that they are directly related to brain activity. The next step in psychology's development toward becoming an experimental science was to examine *scientifically* how sensory stimulation is systematically related to conscious experience.

THE RISE OF EXPERIMENTAL PSYCHOLOGY

The very important difference between what is physically present in the world and what is experienced psychologically had been recognized and agonized over for centuries. This was the distinction that had caused Galileo to conclude that a science of psychology was impossible and Hume to conclude that we could know nothing about the physical world with certainty. Kant amplified this distinction when he claimed that the mind embellished sensory experience, and Helmholtz reached the same conclusion with his concept of unconscious inference.

With advances in science, much had been learned about the physical world—including about the physical stimulation of the sense receptors, which convert that stimulation into nerve impulses, and about the brain structures where those impulses terminate. There was never much doubt about the existence of consciousness; the problem was in determining what we were conscious of and what caused that consciousness. By now it was widely believed that conscious sensations were triggered by brain processes, which themselves were initiated by sense reception. But the question remained: How are the two domains (conscious mental events and the physiological processes of our sensory system) related?

Ernst Heinrich Weber

Ernst Heinrich Weber (1795–1878), a contemporary of Johannes Müller, was born in Wittenberg the son of a theology professor. He was the third of 13 children. Weber obtained his doctorate from the University of Leipzig in 1815 and taught there until his retirement in 1871. Weber was a physiologist who was interested in the senses of touch and **kinesthesis** (muscle sense). Most of the research on sense perception before Weber had been confined to vision and audition. Weber's research consisted largely in exploring skin and muscle sensations. Weber was among the first to demonstrate that the sense of touch is not one but several senses. For example, what is ordinarily called the sense of touch includes the senses of pressure, temperature, and pain. Weber also provided convincing evidence that there is a muscle sense. It was in regard to the muscle sense that Weber performed his work on just noticeable differences, which we consider shortly.

Ernst Heinrich Weber

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Touch and Kinesthesis. For the sensation of touch, Weber attempted to determine the least spatial separation at which two points of touch on the body could be discriminated. Using a compass-like device consisting of two points, he simultaneously applied two points of pressure to a subject's skin. The smallest distance between the two points at which the subject reported sensing two points instead of one was called the **two-point threshold**. In his famous book *One Touch: Anatomical and Physiological Notes* (1834), Weber provided charts of the entire body with regard to the two-point threshold. He found the smallest two-point threshold on the tongue (about 1 millimeter) and the largest in the middle of the back (about 60 millimeters). He assumed that the differences in thresholds at different places on the body resulted from the anatomical arrangement of the sense receptors for touch—the more receptors, the finer the discrimination.

Within the history of psychology, Weber's research on the muscle sense, or kinesthesis, is even more important than his research on touch. It was while investigating kinesthesis that Weber ran his important weight-discrimination experiments. In general, he sought to determine the smallest difference between two weights that could be discriminated. To do this, he had his subjects lift one weight (the standard), which remained the same during a series of comparisons, and then lift other weights. The subject was to report whether the varying weights were heavier, lighter, or the same as the standard weight. He found that when the variable weights were only slightly different from the standard, they were judged to be the same as the standard. Through a series of such comparisons, Weber was able to determine the **just noticeable difference (jnd)** between the standard and the variable weight. It is important to note that, although Weber did not label them as such, jnds were *psychological experiences* (conscious sensations).

Weber ran the basic weight-discrimination experiment under two conditions. In one condition, the weights were placed on the subject's hands while the hands were resting on a table. In this condition, the subject's judgments were made primarily on the basis of tactile sensations. In the second condition, the subject lifted the hands with the weights on them. In this condition, the subject's judgments were made on the basis of both tactile and kinesthetic sensations. It was found that subjects could detect much smaller weight differences when they lifted the weights than they could when the weights were simply placed on their hands. Weber thought that it was the involvement of kinesthesis in the lifted-weight condition that provided the greater sensitivity to weight differences.

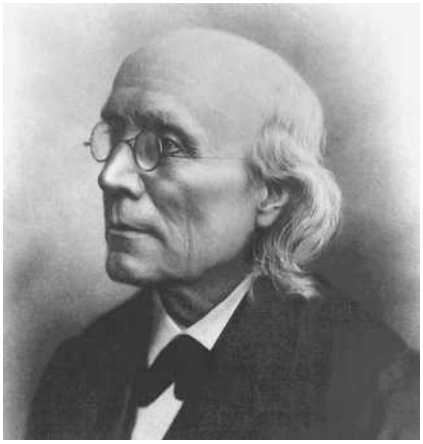
Judgments Are Relative, Not Absolute. During his research on kinesthesis, Weber made the startling observation that the jnd is a constant fraction of the standard weight. For lifted weights, that fraction is 1/40; for nonlifted weights, it is 1/30. Using lifted weights as an example, if the standard weight is 40 grams, the variable weight would have to be 41 grams to be judged heavier or 39 grams to be judged lighter than the standard. If the standard weight is 160 grams, the variable weight would have to be 164 grams or 156 grams to be judged heavier or lighter, respectively, than the standard. Weber then aligned himself with the large number of scientists and philosophers who found that there was not a simple one-to-one correspondence between what is present physically and what is experienced psychologically. Weber observed that discrimination does not depend on the absolute difference between two weights but on the relative difference between the two, or the ratio of one to the other. Weber extended his research to other sense modalities and found evidence that suggested that there is a constant fraction corresponding to jnds for each sense modality.

The finding that jnds corresponded to a constant fraction of a standard stimulus was later called **Weber's law**, and it can be considered the first quantitative law in psychology's history. This was the first statement of a systematic relationship between physical stimulation and a psychological experience. But because Weber was a physiologist, psychology was not his primary concern. It was Fechner who realized the implications of Weber's work for psychology and who saw in it the possible resolution of the mind–body problem.

Gustav Theodor Fechner

Gustav Theodor Fechner (1801–1887) was a brilliant, complex, and unusual individual. Fechner's father had succeeded his grandfather as village pastor. After his father died, Fechner, his brother, and his mother spent the next nine years with Fechner's uncle, who was also a pastor. At the age of 16, Fechner began his studies in medicine at the University of Leipzig (where Weber was studying) and obtained his medical degree in 1822 at the age of 21. Upon receiving his medical degree, Fechner's interest shifted from biological science to physics and mathematics. At this time, he made a meager living by translating into German certain French handbooks of physics and chemistry, by tutoring, and by lecturing occasionally. Fechner was interested in the properties of electric currents and in 1831 published a significant article on the topic, which established his reputation as a physicist. In 1834, when he was 33 years old, Fechner was appointed professor of physics at Leipzig. Soon his interests began to turn to the problems of sensation, and by 1840 he had published articles on color vision and afterimages.

Around 1840, Fechner had a "nervous breakdown," resigned his position at Leipzig, and became a recluse. Additionally, Fechner had been almost blinded, presumably while looking at the sun through colored glasses during his research on afterimages. At this time, Fechner entered a state of severe depression that was to last several years and that resulted in his interests turning from physics to philosophy. The shift was in emphasis only, however, because throughout his adult life he was uncomfortable with materialism, which he called the "nightview"; it contrasted with the "dayview," which emphasized mind, spirit, and consciousness. He accepted Spinoza's double-aspect view of mind and body, and therefore believed that consciousness is as prevalent in the universe as is matter. Because he believed that consciousness cannot be separated from physical things, his position represents **panpsychism**; that is, all things that are physical are also conscious.



Gustav Theodor Fechner

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In his lifetime, Fechner wrote 183 articles and 81 books and edited many others (Bringmann, Bringmann, & Balance, 1992). He died in his sleep on November 18, 1887, at the age of 86, a few days after suffering a stroke. He was eulogized by his friend and colleague Wilhelm Wundt.

The Adventures of Dr. Mises. Although Fechner was an outstanding scientist, there was a side of him that science could not satisfy. In addition to Fechner the materialistic scientist, there was Fechner the satirist, philosopher, and mystic. For a young scientist to express so many viewpoints, especially because many of them were seemingly incompatible with science, would have been professional suicide. So, Fechner invented a person to speak for his other half, and thus was born "Dr. Mises." The pseudonym Dr. Mises first appeared while Fechner was still a medical student. Under this pseudonym, Fechner wrote *Proof That the Moon Is Made of Iodine* (1821), a satire on the medical profession's tendency to view iodine as a panacea. In 1825 Dr. Mises published *The Comparative Anatomy of Angels*, in which it is reasoned, tongue firmly in cheek, that angels cannot have legs. Marshall (1969) summarizes the argument:

> Centipedes have God-knows-how-many
> legs; butterflies and beetles have six,
> mammals only four; birds, who of all

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> earthly creatures rise closest to the angels, have just two. With each developmental step another pair of legs is lost, and "Since the final observable category of creatures possesses only two legs, it is impossible that angels should have any at all." (p. 51)

Dr. Mises also argued that because the sphere is the most perfect shape and angels are perfect, angels must be spherical; but planets are also spherical, so angels must be planets.

There followed *The Little Book of Life After Death* (1836), *Nanna, or Concerning the Mental Life of Plants* (1848), and *Zend-Avesta, or Concerning Matters of Heaven and the Hereafter* (1851). In all, Dr. Mises was heard from 14 times from 1821 to 1879. Fechner always used Dr. Mises to express the dayview, the view that the universe is alive and conscious. Always behind Fechner's satire or humor was the message that the dayview should be taken seriously. Marshall (1969) makes this point concerning *Zend-Avesta*:

> Indeed, in Zoroastrian dogma, *Zend-Avesta* meant the "living word," and Fechner was to intend that his own *Zend-Avesta* should be the word which would reveal all nature to be alive. In this work Fechner argues that the earth is ensouled, just as the human being is; but the earth possesses a spirituality which surpasses that of her creatures. (p. 54)

In fact, it was in *Zend-Avesta* that Fechner first described what would later become psychophysics:

> [Fechner] laid down the general outlines of his program [psychophysics] in *Zend-Avesta*, the book about heaven and the future life. Imagine sending a graduate student of psychology nowadays to the Divinity School for a course in immortality as preparation for advanced experimental work in psychophysics! How narrow we have become! (Boring, 1963, p. 128)

In *The Little Book of Life After Death*, written to console a friend who had just lost a loved one, Dr. Mises described human existence as occurring in three stages. The first stage is spent alone in continuous sleep in the darkness of the mother's womb. The second stage, after birth, is spent alternating between sleeping and waking and in the company of other people. During this second stage, people often have glimpses into the third stage. These glimpses include moments of intense faith or of intuitions that cannot be explained by one's life experiences. Dr. Mises tells us that we enter the third stage by dying: "The passing from the first to the second stage is called birth; the transition from the second to the third is called death" (Fechner, 1836/1992, p. 7). Just as unborn children cannot foresee their forthcoming experiences in stage two, people cannot foresee their forthcoming experiences in stage three. In the third stage, one's soul merges with other souls and becomes part of the "Supreme Spirit." It is only during this stage that the ultimate nature of reality can be discerned.

Whether as Dr. Mises or not, Fechner was always interested in spiritual phenomena. He was also interested in parapsychology and even attended several seances in which he experienced the anomalous movements of a bed, a table, and even himself. His belief and involvement in parapsychology is clearly seen in the last book he wrote as Dr. Mises, *The Dayview as Compared to the Nightview* (1879).

Psychophysics. From Fechner's philosophical interest in the relationship between the mind and the body sprang his interest in psychophysics. He wanted desperately to solve the mind–body problem in a way that would satisfy the materialistic scientists of his day. Fechner's mystical philosophy taught him that the physical and mental were simply two aspects of the same fundamental reality. Thus, as we have seen, he accepted the double aspectism that Spinoza had postulated. But to say that there is a demonstrable relationship between the mind and the body is one thing; proving it is another matter. According to Fechner, the solution to the problem occurred to him the morning of October 22, 1850, as he was lying in bed (Adler, 1996). His insight was that a systematic relationship between bodily and mental experience could be

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demonstrated if a person were asked to report changes in sensations as a physical stimulus was systematically varied. Fechner speculated that for mental sensations to change arithmetically, the physical stimulus would have to change geometrically. In testing these ideas, Fechner created the area of psychology that he called **psychophysics**.

As was mentioned, Fechner's insight concerning the relationship between stimuli and sensations was first reported in *Zend-Avesta* (1851). Fechner spent the next few years experimentally verifying his insight and published two short papers on psychophysics in 1858 and 1859. Then in 1860 he published his famous *Elements of Psychophysics*, a book that arguably launched psychology as an experimental science.

As the name suggests, psychophysics is the study of the relationship between physical and psychological events. Fechner's first step in studying this relationship was to state mathematically what Weber had found and to label the expression Weber's law:

$$\frac{\Delta R}{R} = k,$$

where

$R =$ Reiz (the German word for "stimulus"). In Weber's research, this was the standard stimulus.

$\Delta R =$ The minimum change in R that could be detected; that is, the minimum change in physical stimulation necessary to cause a person to experience a jnd.

$k =$ A constant. As we have seen, Weber found this constant to be 1/40 of R for lifted weights.

Weber's law concerns the amount that a physical stimulus must change before it results in the awareness of a difference or in a change of sensation (S). Through a series of mathematical calculations, Fechner arrived at his famous formula, which he believed showed the relationship between the mental and the physical (the mind and the body):

$$S = k \log R$$

This formula mathematically states Fechner's earlier insight. That is, for sensations to rise arithmetically (the left side of the equation), the magnitude of the physical stimulus must rise geometrically (the right side of the equation). This means that as a stimulus gets larger, the magnitude of the change must become greater and greater if the change is to be detected. For example, if the stimulus (R) is 40 grams, a difference of only 1 gram can be detected; whereas if the stimulus is 200 grams, it takes a difference of 5 grams to cause a jnd. In everyday terms, this means that sensations are always relative to the level of background stimulation. If a room is dark, for example, turning on a dim light will be immediately noticed, as would a whisper in a quiet room. If a room is already illuminated, however, the addition of a dim light would go unnoticed, as would a whisper in a noisy room. However, Fechner did not believe his formula applied only to the evaluation of simple stimuli. He believed it applied to the more complex realm of human values as well:

> Our physical possessions … have no value or meaning for us as inert material, but constitute only a means for arousing within us a sum of psychic values. In this respect they take the place of stimuli. A dollar has, in this connection, much less value to a rich man than to a poor man. It can make a beggar happy for a whole day, but it is not even noticed when added to the fortune of a millionaire. (1860/1966, p. 197)

The JND as the Unit of Sensation. Fechner assumed that as the magnitude of a stimulus increased from zero, a point would be reached where the stimulus could be consciously detected. The lowest intensity at which a stimulus can be detected is called the **absolute threshold**. That is, the absolute threshold is the intensity of a stimulus at or above which a sensation results and below which no detectable sensation occurs. According to Fechner, intensity levels below the absolute threshold do cause reactions, but those reactions are unconscious. In that it allowed for these **negative sensations**, Fechner's position was very much like those of Leibniz (petites perceptions) and Herbart (threshold of

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consciousness). For all three, the effects of stimulation cumulated and, at some point (the absolute threshold), was capable of causing a conscious sensation.

Fechner's analysis of sensation started with the absolute threshold, but because that threshold provided only one measure, it was of limited usefulness. What Fechner needed was a continuous scale that showed how sensations above the absolute threshold varied as a function of level of stimulation. This was provided by the **differential threshold**, which is defined by how much a stimulus magnitude needs to be increased or decreased before a person can detect a difference. It was in regard to the differential threshold that Fechner found that stimulus intensities must change geometrically in order for sensation to change arithmetically. Given a geometric increase in the intensity of a stimulus, Fechner assumed that sensations increased in equal increments (jnds). With this assumption it was possible, using Fechner's equation, to deduce how many jnds above absolute threshold a particular sensation was at any given level of stimulus intensity. In other words, Fechner's law assumed that sensations increased in equal units (jnds) as the stimulus intensity increased geometrically beyond the absolute threshold.

With his equation, Fechner believed that he had found the bridge between the physical and the psychical that he sought—a bridge that was scientifically respectable. Subsequent research demonstrated that the predictions generated by Fechner's equation were accurate primarily for the middle ranges of sensory intensities. Predictions were found to be less accurate for extremely high or low levels of physical intensity.

Psychophysical Methods. After establishing that mental and physical events varied systematically, and thus showing that a science of the mind is indeed possible (contrary to the beliefs of such individuals as Galileo, Comte, and Kant), Fechner employed several methods to further explore the mind–body relationship:

- The **method of limits** (also called the method of just noticeable differences): With this method, one stimulus is varied and is compared to a standard. To begin with, the variable stimulus can be equal to the standard and then varied, or it can be much stronger or weaker than the standard. The goal here is to determine the range of stimuli that the subject considers to be equal to the standard.
- The **method of constant stimuli** (also called the method of right and wrong cases): Here, pairs of stimuli are presented to the subject. One member of the pair is the standard and remains the same, and the other varies in magnitude from one presentation to another. The subject reports whether the variable stimulus appears greater than, less than, or equal to the standard.
- The **method of adjustment** (also called the method of average error): Here, the subject has control over the variable stimulus and is instructed to adjust its magnitude so that the stimulus appears equal to the standard stimulus. After the adjustment, the average difference between the variable stimulus and the standard stimulus is measured.

These methods were another of Fechner's legacies to psychology, and they are still used today.

Fechner's Contributions. In addition to creating psychophysics, Fechner also created the field of experimental aesthetics. Between 1865 and 1876, Fechner wrote several articles attempting to quantify reactions to works of art. For example, in an effort to discover the variables that made some works of art more pleasing than others, Fechner analyzed 20,000 paintings from 22 museums (Fechner, 1871). After publishing his major work on aesthetics (1876), Fechner spent the remainder of his professional life responding to criticisms of psychophysics. For further discussion of Fechner's experimental aesthetics, see Arnheim, 1985.

Fechner did not solve the mind–body problem; it is still alive and well in modern psychology. Like Weber, however, he did show that it was possible to measure mental events and relate them to physical ones. Some historians have suggested that the

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beginning of experimental psychology *is* the 1860 publication of Fechner's *Elements*. Although a good case can be made, most agree that another important step had to be taken before psychology could emerge as a full-fledged science: Psychology needed to be formalized as a separate discipline apart from both philosophy and physiology. As we will see in Chapter 9, it was Wilhelm Wundt who took that step.

SUMMARY

The discovery of individual differences among astronomers in the recording of astronomical events demonstrated the need, even within the physical sciences, for understanding how the physical world was sensed and mentally represented. An intense investigation of the human sensory apparatus and nervous system followed. Bell and Magendie discovered that some nerves are specialized to carry sensory information to the brain, whereas others are specialized to carry sensory information from the brain to the muscles of the body. Müller found that each sensory nerve was specialized to produce a certain type of energy, which in turn produced a certain type of sensation. For example, no matter how the optic nerve is stimulated, it will produce the sensation of light. The same is true for all other sensory nerves of the body. Müller's finding is called the doctrine of specific nerve energies.

Helmholtz is a monumental figure in the history of science. He opposed the belief in vitalism that his teacher Müller and others held. For Helmholtz nothing was beyond scientific investigation. Ignoring the contention that nerve impulses are too fast to be measured, he measured their speed and found them to be remarkably slow.

Helmholtz differentiated between sensations and perceptions, the former being the raw images provided by the sense receptors and the latter reflecting the meaning that past experiences give to those raw sensations. Through the process of unconscious inference, the wealth of prior experience we have had with objects and events is brought to bear on current sensations, converting them into perceptions. Helmholtz extended the doctrine of specific nerve energies to color vision by saying that specific receptors on the retina corresponded to each of the three additive primary colors: red, green, and blue-violet. For Helmholtz, all experiences of color could be explained as the stimulation of one or a pattern of the three types of color receptors. Because Young had earlier proposed a similar theory of color vision, the theory became known as the Young–Helmholtz (or trichromatic) theory of color vision.

Helmholtz also explained auditory perception by applying the doctrine of specific nerve energies. He believed that tiny fibers on the basilar membrane each respond to a different frequency and that our auditory perception results from the combination of the various fibers that are being stimulated at any given time. This is called the resonance place theory of auditory perception. Helmholtz's work clearly indicated that there is a difference between what is present physically and what is experienced psychologically. The reason for this difference is that the sensory equipment of the body is not capable of responding to everything that is physically present. Although Helmholtz found substantial mismatches between what is present physically and what is experienced psychologically, he did postulate an active mind that takes whatever sensory information is available and creates the best possible interpretation of external reality. Helmholtz's work moved physiology closer to psychology and thus paved the way for experimental psychology.

In his explanation of perceptual phenomena, Helmholtz sided with the empiricists, but Hering sided with the nativists. In his explanation of color vision, Hering postulated red-green, yellow-blue, and black-white receptors on the retina that could either be torn down (causing the color experiences of red, yellow, and white, respectively), or built up (causing the experiences of green, blue, and black, respectively). Hering's theory could explain a number of color experiences that Helmholtz's theory could not. Ladd-Franklin proposed a theory of color vision based on evolutionary principles.

Gall and Spurzheim expanded faculty psychology into phrenology, claiming that faculties are housed in specific areas of the brain, and an evaluation of a person's faculties could be made by examining the bumps and depressions of his or her skull. Phrenology became very popular because it aimed to provide an objective method of studying the mind and because it seemed to provide practical information. Many phrenologists believed that various faculties could be strengthened by practicing the activities associated with them. This belief resulted in the formal discipline, or the "mental muscle" approach to education. Flourens experimentally tested many of the conclusions the phrenologists had reached concerning the localization of brain function, and although he found some evidence for localization of function in the lower parts of the brain, he concluded that the cortex itself acts as a whole.

Using the clinical method, however, Broca did find evidence for an area of the cortex responsible for the ability to articulate speech. Later, Wernicke discovered a cortical area responsible for speech comprehension. Furthermore, Fritsch and Hitzig found a motor area on the cortex, and Ferrier further articulated the motor cortex and then mapped cortical areas associated with the cutaneous senses, audition, olfaction, and vision. Thus, there did seem to be localization of function on the cortex, but the functions were not the same as those the phrenologists had proposed, nor were they in the locations the phrenologists had suggested.

Weber was the first to attempt to quantify the relationship between a physical stimulus and the sensation it caused. He determined the two-point threshold for various parts of the body by observing the smallest distance between two points of stimulation that would be reported as two points. Working with weights, Weber determined how much heavier or lighter than a standard a weight must be before it was reported as being different than the standard. This sensation of difference was called a just noticeable difference (jnd).

Fechner expanded Weber's work by showing that jnds are related to stimulation in a geometric way. That is, as the magnitude of the standard stimulus increases, so did the amounts that needed to be added to or subtracted from a comparison stimulus before those differences could be noticed. In addition to psychophysics, Fechner also created the field of experimental aesthetics. Now that it had been demonstrated that mental events could be studied experimentally, the ground was laid for the founding of psychology as an experimental science.

DISCUSSION QUESTIONS

1. What significance did the observation that astronomers differ in their reaction times have for the history of psychology?
2. What is the Bell-Magendie law? What was the significance of this law in the history of psychology?
3. Summarize Müller's doctrine of specific nerve energies.
4. Define *vitalism*. Was Müller a vitalist? Was Helmholtz?
5. How did Helmholtz apply the principle of conservation of energy to living organisms?
6. How did Helmholtz explain perception? Include in your answer a discussion of unconscious inference.
7. Summarize the Young–Helmholtz theory of color vision.
8. Summarize the resonance place theory of auditory perception.
9. Discuss the importance of Helmholtz's work for the development of psychology as a science.
10. How did Hering explain space perception?
11. Summarize Hering's theory of color vision.

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12. Discuss the theory of color vision proposed by Ladd-Franklin.
13. Discuss the basic tenets of phrenology. Also discuss the reasons for phrenology's popularity and its influence on psychology.
14. Describe Flourens's approach to brain research. Did his conclusions support or refute phrenology? Explain.
15. Describe Broca's approach to brain research. What conclusions did he reach concerning the functioning of the brain?
16. What approach to brain research did Fritsch, Hitzig, and Ferrier take? Did their results support Gall or Flourens? Explain.
17. What significance did Weber's work have for the development of experimental psychology? In your answer, describe Weber's research techniques and his findings.
18. Who was Dr. Mises?
19. Summarize Fechner's psychophysical work and methods.
20. What were Fechner's contributions to the development of psychology as a science?

SUGGESTIONS FOR FURTHER READING

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GLOSSARY

Absolute threshold The smallest amount of stimulation that can be detected by an organism.

Adequate stimulation Stimulation to which a sense modality is maximally sensitive.

Bell, Charles (1774–1842) Discovered, in modern times, the distinction between sensory and motor nerves.

Bell-Magendie law There are two types of nerves: sensory nerves carrying impulses from the sense receptors to the brain and motor nerves carrying impulses from the brain to the muscles and glands of the body.

Broca, Paul (1824–1880) Found evidence that part of the left frontal lobe of the cortex is specialized for speech production or articulation.

Broca's area The speech area on the left frontal lobe side of the cortex (the inferior frontal gyrus).

Clinical method The technique that Broca used. It involves first determining a behavior disorder in a living patient and then, after the patient had died, locating the part of the brain responsible for the behavior disorder.

Differential threshold The amount that stimulation needs to change before a difference in that stimulation can be detected.

Doctrine of specific nerve energies Each sensory nerve, no matter how it is stimulated, releases an energy specific to that nerve.

Du Bois-Reymond, Emil (1818–1896) Is considered the father of electrophysiology. Like Helmholtz he measured the speed of the nerve impulse. He also discovered the electrical nature of the action potential.

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Fechner, Gustav Theodor (1801–1887) Expanded Weber's law by showing that, for just noticeable differences to vary arithmetically, the magnitude of a stimulus must vary geometrically.

Ferrier, David (1843–1928) Created a more detailed map of the motor cortex than Fritsch and Hitzig had. He also mapped cortical areas corresponding to the cutaneous senses, audition, olfaction, and vision.

Flourens, Pierre (1794–1867) Concluded that the cortical region of the brain acts as a whole and is not divided into a number of faculties, as the phrenologists had maintained.

Formal discipline The belief that the faculties of the mind can be strengthened by practicing the functions associated with them. Thus, one supposedly can become better at reasoning by studying mathematics or logic.

Fritsch, Gustav (1838–1927) Along with Hitzig, discovered motor areas on the cortex by directly stimulating the exposed cortex of a dog.

Gall, Franz Joseph (1758–1828) Believed that the strengths of mental faculties varied from person to person and that they could be determined by examining the bumps and depressions on a person's skull. Such an examination came to be called phrenology. (*See also* **Phrenology**.)

Helmholtz, Hermann von (1821–1894) A monumental figure in the history of science who did pioneer work in the areas of nerve conduction, sensation, perception, color vision, and audition.

Hering, Ewald (1834–1918) Offered a nativistic explanation of space perception and a theory of color vision based on the existence of three color receptors, each capable of a catabolic process and an anabolic process. Hering's theory of color vision could explain a number of color experiences that Helmholtz's theory could not.

Hitzig, Eduard (1838–1907) Along with Fritsch, discovered motor areas on the cortex by directly stimulating the exposed cortex of a dog.

Just noticeable difference (jnd) The sensation that results if a change in stimulus intensity exceeds the differential threshold. (*See also* **Differential threshold**.)

Kinesthesis The sensations caused by muscular activity.

Ladd-Franklin, Christine (1847–1930) Proposed a theory of color vision based on evolutionary principles.

Magendie, François (1783–1855) Discovered, in modern times, the distinction between sensory and motor nerves.

Method of adjustment An observer adjusts a variable stimulus until it appears to be equal to a standard stimulus.

Method of constant stimuli A stimulus is presented at different intensities along with a standard stimulus, and the observer reports if it appears to be greater than, less than, or equal to the standard.

Method of limits A stimulus is presented at varying intensities along with a standard (constant) stimulus to determine the range of intensities judged to be the same as the standard.

Müller, Johannes (1801–1858) Expanded the Bell-Magendie law by demonstrating that each sense receptor, when stimulated, releases an energy specific to that particular receptor. This finding is called the doctrine of specific nerve energies.

Negative sensations According to Fechner, sensations that occur below the absolute threshold and are therefore below the level of awareness.

Panpsychism The belief that everything in the universe experiences consciousness.

Perception According to Helmholtz, the mental experience arising when sensations are embellished by the recollection of past experiences.

Personal equations Mathematical formulae used to correct for differences in reaction time among observers.

Phrenology The examination of the bumps and depressions on the skull in order to determine the strengths and weaknesses of various mental faculties.

Physiognomy The attempt to determine a person's character by analyzing his or her facial features, bodily structure, and habitual patterns of posture and movement.

Principle of conservation of energy The energy within a system is constant; therefore, it cannot be added to or subtracted from but only transformed from one form to another.

Psychophysics The systematic study of the relationship between physical and psychological events.

Reaction time The period of time between presentation of and response to a stimulus.

Resonance place theory of auditory perception The tiny fibers on the basilar membrane of the inner ear are stimulated by different frequencies of sound. The shorter the fiber, the higher the frequency to which it responds.

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Sensation The rudimentary mental experience caused when sense receptors are stimulated by an environmental stimulus.

Spurzheim, Johann Kaspar (1776–1832) A student and colleague of Gall, who did much to expand and promote phrenology.

Two-point threshold The smallest distance between two points of stimulation at which the two points are experienced as two points rather than one.

Unconscious inference According to Helmholtz, the process by which the remnants of past experience are added to sensations, thereby converting them into perceptions.

Weber, Ernst Heinrich (1795–1878) Using the two-point threshold and the just noticeable difference, was the first to demonstrate systematic relationships between stimulation and sensation.

Weber's law Just noticeable differences correspond to a constant proportion of a standard stimulus.

Wernicke, Carl (1848–1905) Discovered an area on the left temporal lobe of the cortex associated with speech comprehension.

Wernicke's area The area on the left temporal lobe of the cortex associated with speech comprehension.

Young–Helmholtz theory of color vision Separate receptor systems on the retina are responsive to each of the three primary colors: red, green, and blue-violet. Also called the trichromatic theory.

9

Early Approaches to Psychology

We saw in the last chapter that Helmholtz, Weber, and Fechner were pioneers in the development of experimental psychology. In 1862, Wilhelm Wundt performed an experiment that led him to believe that a full-fledged discipline of psychology was possible. Using the apparatus shown in Figure 9.1, Wundt found that it took about 1/10 of a second to shift one's attention from the sound of the bell to the position of the pendulum or vice versa. From this, Wundt concluded not only that the experimental study of psychology was feasible but also that such a psychology must stress selective attention, or volition:

> Wundt suddenly realized that he was measuring the speed of a central mental process, that for the first time, he thought, a self-conscious experimental psychology was taking place. The time it takes to switch attention voluntarily from one stimulus to another had been measured—it varied around a tenth of a second.
>
> At this moment, the unfolding of Wundt's theoretical system began. For it was not the simple fact of the measured speed of selective attention that impressed him as much as it was the demonstration of a central voluntary control process. From then on, a prominent theme in Wundtian psychology was the distinction between voluntary and involuntary actions. (Blumenthal, 1980, pp. 121–122)

In the introduction to his book *Contributions to the Theory of Sense Perception* (1862a), Wundt enunciated the need for a new field of experimental psychology that would uncover the facts of human consciousness. In his epoch-making book *Principles of Physiological Psychology* (1874/1904), Wundt clearly stated that his goal

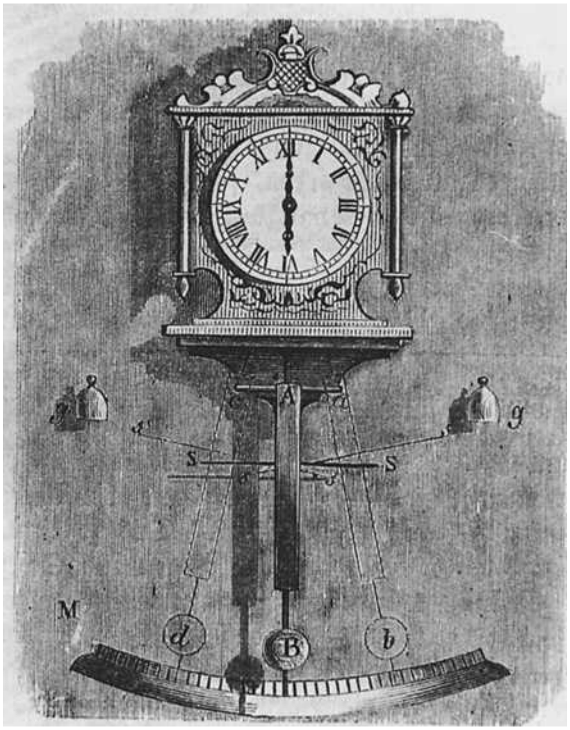

FIGURE 9.1

Wundt's "thought meter." The clock was arranged so that the pendulum (B) swung along a calibrated scale (M). The apparatus was arranged so that a bell (g) was struck by the metal pole(s) at the extremes of the pendulum's swing (d, b), Wundt discovered that if he looked at the scale as the bell sounded, it was never in position d or b but some distance away from either. Thus, determining the exact position of the pendulum as the bell sounded was impossible. Readings were always about 1/10 of a second off. Wundt concluded that one could either attend to the position of the pendulum or to the bell, but not both at the same time.

Wundt (1862b, p. 264).

was to create such a field. It should be noted that in Wundt's time the term *physiological* meant more or less the same as *experimental*. Thus, reading "physiological psychology" in the title of Wundt's book as "experimental psychology" is more accurate than viewing it as emphasizing a search for the biological correlates of thought and behavior, as is the case with much physiological psychology today.

Within an academic discipline, a **school** is defined as a group of individuals who share common assumptions, work on common problems, and use common methods. This definition of *school* is very similar to Kuhn's definition of *paradigm*. In both a school of thought and a paradigm, individuals work to explore the problems articulated by a particular viewpoint. That is, they engage in what Kuhn (1996) called normal science.

By 1890 students the world over were traveling to Leipzig to be trained in the school of experimental psychology under Wundt. In turn, a staggering amount of research poured out of Wundt's laboratory, and laboratories similar to his were being established throughout the world, including in the United States.

VOLUNTARISM

Wundt's stated goal was to understand consciousness, and his pursuit of this goal was very much within the German rationalistic tradition:

> Wundt said that Herbart was second only to Kant in terms of the debt owed for the development of his own thoughts…. But beyond Herbart and Kant, there looms the influence of Leibniz, in whose shadow Wundt clearly felt himself to be working from the beginning…. Numerous … references to Leibniz at key points in Wundt's more theoretical works make it clear that he felt a special affinity with this philosopher. (Danziger, 1980a, pp. 75–76)

Wundt opposed materialism, about which he said, "Materialistic psychology … is contradicted by … the fact of consciousness itself, which cannot possibly be derived from any physical qualities of

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material molecules or atoms" (1912/1973, p. 155). He also opposed aspects of empiricism, in which a person is viewed as the passive recipient of sensations that are then automatically "organized" by the laws of association. Lacking in empiricism, according to Wundt, were central volitional processes that act on the elements of thought giving them forms, qualities, or values not found in either external stimulation or the elemental events themselves.

Wundt's goal was not only to understand consciousness as it is experienced but also to understand the mental laws that govern the dynamics of consciousness. Of utmost importance to Wundt was the concept of **will** as it was reflected in attention and volition. Wundt said that will was the central concept in terms of which all of the major problems in psychology must be understood (Danziger, 1980b). Wundt believed that humans can decide what is attended to and thus what is perceived. Furthermore, he believed that much behavior and selective attention are undertaken for a purpose; that is, such activities are motivated. The name that Wundt gave to his approach to psychology was **voluntarism** because of its emphasis on will, choice, and purpose.

Voluntarism, then, was psychology's first school—not structuralism, as is often claimed. Structuralism is the name used by Edward Titchener, one of Wundt's students (discussed later), for his program in the United States.

WILHELM MAXIMILIAN WUNDT

Wilhelm Maximilian Wundt (1832–1920) was born at Neckarau, a suburb of the important commercial center of Mannheim, the same year that Goethe died. When he was four years old, he and his family moved to the small town of Heidelsheim. He was the fourth, and last, child of a Lutheran minister. His father's side of the family included historians, theologians, economists, and two presidents of the University of Heidelberg. On his mother's side were physicians, scientists, and government officials. Despite the intellectually stimulating atmosphere in which Wundt grew up (or perhaps because of it), he remained a shy, reserved person who was fearful of new situations. Wundt's only sibling to survive infancy was a brother, eight years his elder, who went away to school. Wundt's only friend his own age was a mentally retarded boy who could barely speak. When Wundt was about eight years old, his education was turned over to a young vicar who worked in his father's church. The vicar was Wundt's closest friend until Wundt entered high school. Wundt's first year in high school was a disaster: he made no friends, daydreamed incessantly, was physically punished by his teachers, and finally failed. At this time, one of his teachers suggested that a reasonable aspiration for Wundt would be a career in the postal service (Diamond, 1980). The following year, he started high school over, this time in the city of Heidelberg, where his brother and a cousin were students. Although he was not an outstanding student, he did better there.

After graduation from high school, Wundt enrolled in the premedical program at the University of Tubingen. He stayed for a year and then transferred to the University of Heidelberg, where he became one of the top medical students in his class, graduated summa cum laude, and placed first in the state medical board examination. After receiving his medical degree in 1855 at the age of 23, he went to Berlin and studied with Johannes Müller, who so

Wilhelm Maximilian Wundt

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influenced Wundt that he decided to pursue a career in experimental physiology instead of medicine. After a year of working and studying at Müller's institute, Wundt returned to the University of Heidelberg, where he became Helmholtz's laboratory assistant. While working for Helmholtz, Wundt gave his first course in psychology as a natural science and wrote his first book, *Contributions to the Theory of Sense Perception* (1862a). In this book, Wundt formed the plan for psychology that he was to follow for the rest of his life. Next, he published *Lectures on Human and Animal Psychology* (1863).

Wundt believed that experimental psychology could be used in an effort to understand immediate consciousness (discussed later) but that it was useless in attempting to understand the higher mental processes and their products. For the study of the latter, only naturalistic observation or historical analysis could be used. Both of these concerns were clearly present in *Lectures*, the first part of which included a history of psychology, a review of research on sensation and perception, and research related to the personal equation. The second part of *Lectures* included discussions of aesthetic and religious feelings, moral judgments, the development of societies, comparative religion, language, and the will. In fact, most of the topics that later appeared in *Völkerpsychologie* (1900–1920), the monumental 10-volume work that Wundt worked on for the last 20 years of his life, first appeared in *Lectures* in 1863. Wundt remained at Heidelberg until 1874, when he accepted a professorship in inductive philosophy at the University of Zurich in Switzerland. The following year he was offered an appointment to teach scientific philosophy at the University of Leipzig. Wundt accepted the appointment and remained at Leipzig for 45 years.

Wundt wanted to teach experimental psychology at Leipzig in 1875, but the university could not provide space for his equipment; he ended up teaching courses in anthropology, logic, and language instead. He obtained the space he needed the following year and began teaching experimental psychology. By 1879 his laboratory was in full production, and he was supervising the research of several students. The year 1879 is usually given as the date of the founding of the first laboratory dedicated exclusively to psychological research. Wundt called his laboratory the Institute for Experimental Psychology. At first, the university administration was not supportive of Wundt's institute, and it was not listed in the university catalog until 1883. The institute became extremely successful, however, and Wundt's lecture classes were among the most popular at the university, sometimes exceeding 250 students (Bringmann, Bringmann, & Ungerer, 1980). In 1881, Wundt began the journal *Philosophical Studies*, the first journal devoted to experimental psychology. He wanted to call his journal *Psychological Studies*, but a journal with that title already existed, although it dealt with spiritualism and parapsychological phenomena. Several years later, Wundt was able to change the name of his journal to the more appropriate *Psychological Studies*.

In response to the increasing popularity of Wundt's institute, it was physically enlarged several times. In 1882 he moved from his small one-room laboratory into an eleven-room facility that had previously been the department of gynecology, and in 1897 he was given an entire new building, which he helped design. During his years at Leipzig, Wundt supervised 186 doctoral dissertations (70 in philosophy and 116 in psychology). His students became pioneers of experimental psychology throughout the world, and we will encounter many of them in the remainder of our text.

Wundt was one of the most productive individuals in the history of psychology. Boring (1950) estimated that from 1853 to 1920, Wundt wrote a total of 53,735 pages:

> If there are 24,836 days in sixty-eight years, then Wundt wrote or revised at the average rate of 2.2 pages a day from 1853 to 1920, which comes to about one word every two minutes, day and night, for the entire sixty-eight years. (p. 345)

Obviously, Wundt's primary interest was his work:

> He never was much excited about anything other than his work. Even his wife and family receive no more than one paragraph in his entire autobiography. His dedication went so far that he analyzed his

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> psychological experiences when he was very seriously ill and near death; at one point in his life he was rather intrigued with the idea of experiencing the process of dying. (Wertheimer, 1987, p. 62)

Appropriately, the last thing Wundt worked on was his autobiography, which he finished a few days before he died at the age of 88.

Psychology's Goals

Wundt disagreed with individuals like Galileo, Comte, and Kant who claimed that psychology could never be a science; and he disagreed with Herbart, who said that psychology could be a mathematical science but not an experimental one. Wundt believed strongly that psychology had, in fact, become an experimental science. As we have seen, however, in his comprehensive view of psychology, experimentation played only a limited role. He believed that experimentation could be used to study the basic processes of the mind but could not be used to study the higher mental events. For the latter, only various forms of naturalistic observation could be used. We will see how Wundt proposed to study the higher mental thought processes when we discuss his *Völkerpsychologie*. Still, the role of experimental psychology was vital to Wundt. Learning about the simpler conscious processes was fundamental for understanding those that are more complex: "Let us remember the rule, valid for psychology as well as for any other science, that we cannot understand the complex phenomena, before we have become familiar with the simple ones which presuppose the former" (Wundt, 1912/1973, p. 151). To summarize, according to Wundt, psychology's goal was to understand both simple and complex conscious phenomena. For the former, experimentation could be used; for the latter, it could not.

Mediate and Immediate Experience. Wundt believed that all sciences are based on experience and that scientific psychology is no exception. But the *type* of experience psychology would use would be different. Whereas other sciences were based on **mediate experience**, psychology was to be based on **immediate experience**. The data the physicist uses, for example, are provided by various measuring devices such as spectrometers (to measure wavelengths of light) or sound spectrographs (to measure the frequencies and intensities of sound waves). The physicist records the data these devices provide and then uses the data to analyze the characteristics of the physical world. Thus the experience of the natural scientist is mediated by recording devices and is not direct. For Wundt the subject matter of psychology was to be human consciousness *as it occurred*.

Once the mental elements were isolated, the laws governing their combination into more complex experiences could be determined. Thus, Wundt set two major goals for his experimental psychology: (1) to discover the basic **elements of thought**, and (2) to discover the laws by which mental elements combine into more complex mental experiences.

Wundt's Use of Introspection

To study the basic mental processes involved in immediate experience, Wundt used a variety of methods, including **introspection**. Wundt's use of introspection bore little resemblance, however, to how the empiricists and sensationalists used it to study ideas and association. Wundt distinguished between *pure introspection*, the relatively unstructured self-observation used by earlier philosophers, and *experimental introspection*, which he believed to be scientifically respectable:

> Experimental introspection made use of laboratory instruments to vary the conditions and hence make the results of internal perception more precise, as in the psychophysical experiments initiated by Fechner or in the sense-perception experiments of Helmholtz. In most instances saying "yes" or "no" to an event was all that was needed, without any description of inner events. Sometimes the subject responded by pressing a telegraph key. The ideal was to make introspection, in the form of internal

> perception, as precise as external perception. (Hilgard, 1987, p. 44)

Wundt had little patience with colleagues who used introspection in the more philosophical and less objective way. Danziger (1980c) examined 180 studies performed in Wundt's laboratory between 1883 and 1903 and found that all but four used experimental introspection, and Wundt himself criticized two of the four studies that did not. Wundt, then, used introspection more or less as the physiologists (such as Helmholtz) and the psychophysicists had used it—that is, as a technique to determine whether a person is experiencing a specific sensation or not. In fact, Wundt replicated much of the work on audition and vision that the physiologists had done and much of the work on absolute and differential thresholds that the psychophysicists had done.

Elements of Thought

According to Wundt, there are two basic types of mental experience: sensations and feelings. A **sensation** occurs whenever a sense organ is stimulated and the resulting impulse reaches the brain. Sensations can be described in terms of *modality* (visual, auditory, taste, and so on) and *intensity* (such as how loud an auditory stimulus is). Within a modality, a sensation can be further analyzed to determine its *qualities*. For example, a visual sensation can be described in terms of hue (color) and saturation ("richness" of color). An auditory sensation can be described in terms of pitch and timbre ("fullness" of tone). A taste sensation can be described in terms of its degree of saltiness, sourness, bitterness, sweetness, etc.

All sensations are accompanied by **feelings**. Wundt reached this conclusion while listening to the beat of a metronome and noting that some rates of beating were more pleasant than others. From his own introspections, he formulated his **tridimensional theory of feeling**, according to which any feelings can be described in terms of the degree to which they possess three attributes: pleasantness-unpleasantness, excitement-calm, and strain-relaxation.

Perception, Apperception, and Creative Synthesis

Often a discussion of Wundt's system stops with his concern with mental elements and his use of introspection as the means of isolating them. Such a discussion omits some of Wundt's most important ideas. Indeed, sensations and feelings are the elements of consciousness, but in everyday life they are rarely, if ever, experienced in isolation. Most often, many elements are experienced simultaneously, and then **perception** occurs. According to Wundt, perception is a passive process governed by the physical stimulation present, the anatomical makeup of the individual, and the individual's past experiences. These three influences interact and determine an individual's perceptual field at any given time. The part of the perceptual field the individual attends to is *apperceived* (Wundt borrowed the term *apperception* from Herbart).

Attention and apperception go hand in hand; what is attended to is apperceived. Unlike perception, which is passive and automatic, apperception is active and voluntary. In other words, apperception is under the individual's control. It was primarily because Wundt believed so strongly that individuals could direct their attention by exercising their will that he referred to his approach to psychology as voluntarism.

Wundt criticized John Stuart Mill's concept of "mental chemistry," according to which two or more ideas could synthesize and give rise to an idea unlike any of those it comprises. Wundt rejected this process because it is passive, just as the blending of chemical elements is passive. For Wundt the vital difference between his position and that of the empiricists was his emphasis on the active role of attention. When elements are attended to, they can be arranged and rearranged according to the individual's will, and thus arrangements never actually experienced before can result. Wundt called this phenomenon **creative synthesis** and thought that it was involved in all acts of apperception. It was, according to Wundt, the phenomenon of creative synthesis that made psychology a discipline that was qualitatively different from the

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physical sciences. Blumenthal (1998) summarizes Wundt's position as follows:

> There are no *psychological qualities* in physics. For example, there is no red, or green, or blue in that world. Redness, greenness, and blueness are phenomena that are created by the cortex of the experiencing individual. A musical quality, the flavor of the wine, or the familiarity of a face is a rapid creative synthesis that cannot, in principle, be explained as a mere *sum* of elemental physical features. (p. 45)

So, contrary to the popular view that Wundt busied himself searching for the cognitive and emotional elements of a static mind, he viewed the mind as active, creative, dynamic, and volitional. In fact, he believed that the apperceptive process was vital for normal mental functioning, and he speculated that if a person lost the ability to apperceive, his or her thoughts would be disorganized and would appear meaningless, as in the case of schizophrenia. The theory that schizophrenia could be understood as a breakdown of the attentional processes was expanded by Wundt's student and friend Emil Kraepelin (1856–1926). According to Kraepelin, a defect in the "central control process" can result in reduced ability to pay attention, an erratic ability to pay attention, or in extremes in focusing one's attention—any one of which would result in severe mental illness.

As we have seen, Wundt was interested in sensations; and in explaining how sensations combined into perceptions, he remained close to traditional associationism. With apperception, however, he emphasized attention, thinking, and creative synthesis. All these processes are much more closely aligned with the German rationalist tradition than with the empiricist tradition.

Mental Chronometry

In his book *Principles of Physiological Psychology* (1874/1904), Wundt expressed his belief that reaction time could supplement introspection as a technique for studying the elemental contents and activities of the mind. We saw in Chapter 8 that Friedrich Bessel performed the first reaction-time experiment to collect data that could be used to correct for individual differences in reaction times among those observing and reporting astronomical events. Others, such as the physiologist Helmholtz, used the method as well.

Francsicus Cornelius Donders

Courtesy of the National Library of Medicine

Franciscus Cornelius Donders. The famous Dutch physiologist, **Franciscus Cornelius Donders (1818–1889)**, conducted an ingenious series of experiments involving reaction time by noting how long it took a subject to respond to a predetermined stimulus (such as a light) with a predetermined response (such as pressing a button). Donders reasoned that by making the situation more complicated, he could measure the time required to perform various mental acts.

In one experiment, for example, Donders presented several different stimuli to his subjects but instructed them to respond to only one, which he designated ahead of time. This required the subjects to discriminate among the stimuli before responding. The arrangement can be diagrammed as follows:

Stimuli:	A	B	C	D	E
			↓		
Response:			c		

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The time it took to perform the mental act of *discrimination* was determined by subtracting simple reaction time from the reaction time that involved discrimination. Donders then made the situation more complicated by presenting several different stimuli and instructing his subjects to respond to each of them differently. Donders called reactions under these circumstances choice reaction time, and the time required to make a choice was determined by subtracting both simple and discrimination reaction times from choice reaction time.

Wundt's Use of Donders's Methods. Wundt enthusiastically seized upon Donders's methods, believing that they could provide a **mental chronometry**, or an accurate cataloging of the time it took to perform various mental acts. Almost 20% of the early work done in Wundt's laboratory involved repeating or expanding on Donders's research on reaction time. Wundt believed strongly that such research provided another way (along with experimental introspection) of doing what so many had thought to be impossible—experimentally investigating the mind. According to Danziger (1980b), the reaction-time studies conducted during the early years of Wundt's laboratory constitute the first example of a research program explicitly concerned with psychological issues.

However, Wundt eventually abandoned his reaction-time studies. One reason was that he, like Helmholtz, found that reaction times varied too much from study to study, from subject to subject, and often for the same subject at different times. Reaction time also varied with the sense modality stimulated, the intensity of the stimulus, the number of items to be discriminated and the degree of difference among them, how much practice a subject received, and several other variables. The situation was much too complicated to obtain measurable psychological "constants."

After Wundt rejected them, Donders's methods were largely ignored for years. However, when cognitive psychology emerged in the 1960s, reaction-time procedures were rediscovered and again became a popular method for studying cognitive processes.

Psychological Versus Physical Causation

Wundt believed that psychological and physical causality were "polar opposites" because physical events could be predicted on the basis of antecedent conditions and psychological events could not. It is the will that makes psychological causation qualitatively different from physical causation. We have already seen that Wundt believed humans can willfully arrange the elements of thought into any number of configurations (creative synthesis). Wundt also believed that because intentions are willfully created, they cannot be predicted or understood in terms of physical causation:

> [Wundt argued that the] physical sciences would … describe the act of greeting a friend, eating an apple, or writing a poem in terms of the laws of mechanics or in terms of physiology. And no matter how finegrained and complicated we make such descriptions, they are not useful as descriptions of psychological events. Those events need be described in terms of intentions and goals, according to Wundt, because the actions, or physical forces, for a given psychological event may take an infinite variety of physical forms. In one notable example, he argued that human language cannot be described adequately in terms of its physical shape or of the segmentation of utterances, but rather must be described as well in terms of the rules and intentions underlying speech. For the ways of expressing a thought in language are infinitely variable. (Blumenthal, 1975, p. 1083)

Another factor that makes the prediction of psychological events impossible is what Wundt called the **principle of the heterogony of ends**. According to this principle, a goal-directed activity seldom attains its goal and nothing else. Something unexpected almost always happens that, in turn, changes one's entire motivational pattern:

> An action arising from a given motive produces not only the ends latent in the

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> motive, but also other, not directly purposed, influences. When these latter enter into consciousness and stir up feelings and impulses, they themselves become new motives, which either make the original act of volition more complicated, or they change it or substitute some other act for it. (Wundt, 1912/1973, pp. 168–169)

Wundt also employed the **principle of contrasts** to explain the complexity of psychological experience. He maintained that opposite experiences intensify one another. For example, after eating something sour, something sweet tastes even sweeter, and after a painful experience, pleasure is more pleasurable (Blumenthal, 1980). The related principle, the **principle toward the development of opposites**, states that after a prolonged experience of one type, there is an increased tendency to seek the opposite type of experience. This latter principle not only applies to the life of an individual but also to human history in general (Blumenthal, 1980). For example, a prolonged period during which rationalism is emphasized (for example, the Enlightenment) would tend to be followed by a period during which the human emotions would be emphasized, such as in romanticism.

Volitional Acts Are Creative but Not Free. Wundt was a determinist. That is, he did not believe in free will. Behind all volitional acts were mental laws that acted on the contents of consciousness. These laws were unconscious, complex, and not knowable through either introspection or other forms of experimentation; but laws they were, and their products were lawful. According to Wundt, the laws of mental activity can be deduced only after the fact, and in that sense the psychologist studying them is like a historian:

> Future resultants can never be determined in advance; but … on the other hand it is possible, starting with the given resultants, to achieve, under favourable conditions, an exact deduction into the components. The psychologist, like the psychological historian, is a prophet with his eyes turned towards the past. He ought not only to be able to tell what has happened, but also what necessarily must have happened, according to the position of events. (Wundt, 1912/1973, p. 167)

The historical approach must be used to investigate the higher mental processes, and it is that approach that Wundt used in his *Völkerpsychologie*, to which we turn next.

VÖLKERPSYCHOLOGIE

Although Wundt went to great lengths to found experimental psychology as a separate branch of science and spent years performing and analyzing experiments, he believed, as we have seen, that the higher mental processes, which are reflected in human culture, could be studied only through historical analysis and naturalistic observation. According to Wundt, the nature of the higher mental processes could be deduced from the study of such cultural products as religion, social customs, myths, history, language, morals, art, and the law. Wundt studied these topics for the last 20 years of his life, with his research culminating in his 10-volume ***Völkerpsychologie*** ("folk" or "cultural" psychology). In this work, Wundt emphasized the study of language, and his often neglected conclusions have a strikingly modern ring to them.

Wundt believed that verbal communication begins with a **general impression**, or unified idea, that one wishes to convey. The speaker apperceives this general impression and then chooses words and sentences to express it. Once the speaker has chosen sentences appropriate for expressing the general idea, the next step is that the listener must *apperceive* the speaker's words. That is, the listener must understand the general impression the speaker is attempting to convey. If this occurs, the listener can replicate the speaker's general impression by using any number of different words or sentence structures. Verbal communication, then, is a three-stage process.

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1. The speaker must apperceive his or her own general impression.
2. The speaker chooses words and sentence structures to express the general impression.
3. The listener, after hearing the words and sentences, must apperceive the speaker's general impression.

As evidence for this process, Wundt points out that we often retain the *meaning* of a person's words long after we have forgotten the specific words the person used to convey that meaning.

Beyond language, which was seen as the essence of social interaction, Wundt sought to understand such important questions as how morals arise within a culture, and how religion shapes our behavior. Much of what interests modern social psychologists, sociologists, and anthropologists can be found in the *Völkerpsychologie*.

The Historical Misunderstanding of Wundt

Bringmann and Tweney (1980) observe, "Our modern conceptions of psychology—its problems, its methods, its relation to other sciences, and its limits—all derive in large part from [Wundt's] inquiries" (p. 5). And yet Blumenthal (1975) comments, "To put it simply, the few current Wundt-scholars (and some do exist) are in fair agreement that Wundt as portrayed today in many texts and courses is largely fictional and often bears little resemblance to the actual historical figure" (p. 1081). Blumenthal (1979) speculates that, to a large extent, Wundt's early use of the word *element* was responsible for his being misinterpreted by so many:

> Today I cannot help but wonder whether Wundt had any notion of what might happen the day he chose the word "Elemente" as part of a chapter title. Later generations seized upon the word with such passion that they were eventually led to transform Wundt into something nearly opposite to the original. (p. 549)

The distortion of Wundt's ideas started early: "For all the American students who went abroad to attend Wundt's lectures, very little of Wundt's psychological system survived the return passage" (Blumenthal, 1980, p. 130). Edward Titchener (whom we consider next) was an Englishman who came to the United States and came to be viewed as the U.S. representative of Wundtian ideas. That was a mistake:

> While the stimulus of some of Wundt's ideas is detectable in Titchener's psychology, an enormous cultural and intellectual gulf separated the general approach of these two psychologists.… It seems that [Titchener] genuinely could not think in terms of categories that differed fundamentally from the English positivist tradition. (Danziger, 1980a, pp. 84–85)

So Wundt's school was voluntarism, not structuralism. His methods seldom included the type of introspection that would come to be ridiculed. His interests included understanding the most basic elements of awareness, but also the vast *Völkerpsychologie*. By misrepresenting Wundt, psychology has overlooked a rich source of ideas. Fortunately, Wundt's true psychology is in the process of being rediscovered, and one reason for this may be psychology's return to an interest in cognition.

> Strange as it may seem, Wundt may be more easily understood today than he could have been just a few years ago. This is because of the current milieu of modern cognitive psychology and of the recent research on human information processing. (Blumenthal, 1975, p. 1087)

Holding in abeyance his views, we usually honor Wundt as the founder of scientific psychology for his tenacity in establishing it as an independent academic discipline at Leipzig. As previously noted, he trained well over 100 doctoral students in psychology, including 14 Americans prior to 1900. As such, both his legacy and importance in the history of psychology is undisputed.

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EDWARD BRADFORD TITCHENER

Born in Chichester, England, **Edward Bradford Titchener (1867–1927)** attended Malvern College, a prestigious secondary school. He then went to Oxford from 1885 to 1890, where his academic record was outstanding. While at Oxford, he developed an interest in experimental psychology and translated the third edition of Wundt's *Principles of Physiological Psychology* into English. Following graduation from Oxford, Titchener went to Leipzig and studied for two years with Wundt.

During his first year at Leipzig, Titchener struck up a friendship with Frank Angell, a fellow student who was to play an important role in bringing Titchener to the United States. Upon completing his studies with Wundt, Angell went to Cornell University in Ithaca, New York, to establish a psychological laboratory. After only one year, however, Angell decided to accept a position at Stanford University. When Titchener earned his doctorate in 1892, he was offered the job as Angell's replacement. Titchener wanted the job at Oxford, but there he would have no laboratory facilities. In 1892 he accepted the offer from Cornell and soon developed the largest doctoral program in psychology in the United States. When Titchener arrived at Cornell, he was 25 years old, and he remained there for the rest of his life. However, Titchener stayed a loyal British subject and never became a U.S. citizen.

Titchener ruled his domain with an iron fist. He determined what the research projects would be and which students would work on them. For him, psychology was experimental psychology (as he defined it); and everything that preceded his version of psychology was not psychology at all: "To Titchener, the American psychologies prior to the 1880s—and much since then—were little more than watered-down Cartesianisms, codified phrenologies, or worst of all, thinly disguised theology" (Evans, 1984, p. 18). When the school of behaviorism was introduced by John B. Watson in the early 1900s (see Chapter 12), Titchener (1914) claimed that it was a fine technology of behavior but not psychology. Titchener was also opposed to pursuing psychological information for its applied value; science seeks pure knowledge, and psychology (his psychology) was a science: "Science deals, not with values, but with facts. There is no good or bad, sick or well, useful or useless, in science" (Titchener, 1915, p. 1). Titchener was well aware of developments in abnormal, clinical, developmental, animal-comparative, social psychology, and psychological testing, and he even supported investigations in these areas. In spite of their usefulness, however, he believed that they did not represent pure, experimental psychology—psychology as he defined it.

Edward Bradford Titchener

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Anecdotes about Titchener's authoritarian style abound. It is said that he refused a dinner invitation from Cornell's president because the president had not called in person to invite him. When the president protested that he did not have time to make such personal calls, Titchener said that he at least could have sent his coachman with the invitation. The coachman came, and Titchener went to dinner.

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Needless to say, Titchener's students were in awe of him. Hilgard (1987) describes a lasting experience that Edwin Boring, then a graduate student at Cornell, had with Titchener:

> Once Boring was invited to dinner at Titchener's to celebrate Titchener's birthday. After dinner the cigars were passed and Boring could not refuse under the circumstances, though he had never smoked a cigar. The consequence was that he had to excuse himself presently because of his nausea and go outside to throw up. Still, the honor of having been invited once was so great that every year thereafter Titchener's birthday would be celebrated by dinner at the Boring home, followed by the smoking of a cigar, with the inevitable consequence. (p. 106)

Although Titchener was domineering concerning psychology, it would be a mistake to conclude that he was narrow-minded. He was an accomplished musician and provided instruction in music at Cornell until a music department was established. He conducted a small orchestra in his home on Sunday nights, and students with musical ability were encouraged to participate. Casual, nonpsychological conversation followed the concerts. He was a dedicated and knowledgeable collector of ancient coins, and his home was described as a "veritable museum." In addition, he was well versed in several languages. In his autobiography, Boring (1961) provided a sample of Titchener the generalist:

> He always seemed to me the nearest approach to genius of anyone with whom I have been closely associated.... He was competent with languages, and could ad lib in Latin when the occasion required it. If you had mushrooms, he would tell you at once how they should be cooked. If you were buying oak for a new floor, he would at once come forward with all the advantages of ash. If you were engaged to be married, he would have his certain and insistent advice about the most unexpected aspects of your problems, and if you were honeymooning, he would write to remind you, as he did me, on what day you ought to be back at work. (pp. 22–23)

Boring dedicated his classic *History of Experimental Psychology* (1950) to Titchener. Indeed, it is hard to understand how Boring—certainly the most knowledgeable historian of psychology of his era—could perpetuate the myth that Wundt's and Titchener's versions of psychology were similar. He knew the details of both schools intimately, but elected to represent them in ways that modern scholarship finds questionable. Perhaps he consciously wrote for the American behaviorists of his day, selecting to highlight matters that would best connect with his audience. Perhaps unconsciously he was favoring his mentor Titchener.

Titchener was a charter member of the American Psychological Association (APA) but never attended a meeting, even when the national meeting was held in Ithaca. Instead, in 1904 he founded his own organization, the Experimentalists, and until his death in 1927, he ran it according to his own ideas of what psychology should be. Membership was by Titchener's invitation only. Titchener apparently felt the need to create an organization separate from the APA for two reasons. First, he was upset because the APA failed to expel one of its members (E. W. Scripture—another student of Wundt, and founder of the psychology program at Yale) whom he believed to be guilty of plagiarism. Second, and probably most important, he believed that the APA was too friendly toward a variety of applied topics and therefore was drifting away from pure experimental psychology. For more on the goals and characteristics of Titchener's Experimentalists, see Furumoto (1988), and for more on how the Experimentalists were reorganized following Titchener's death, see Goodwin (2005).

Titchener's Relationship With Female Psychologists

Although the APA had admitted women as members almost from its inception, when Titchener created the Experimentalists, women were excluded.

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The ban on women lasted from the organization's inception until its reorganization two years after Titchener's death, in 1929. Although membership included many of the most illustrious psychologists in the United States, few criticized the ban and several supported it.

Of the female psychologists excluded from Titchener's organization, Christine Ladd-Franklin (see Chapter 8) was the most outraged. In an exchange of letters with Titchener, she expressed extreme indignation with his "old-fashioned" policy. To Titchener's claim that he believed women might be offended by the excessive cigar smoke at the meetings, she replied, "Have your smokers separated if you like (tho I for one always smoke when I am in fashionable society), but a scientific meeting (however personal) is a public affair, and it is not open to you to leave out a class of fellow workers without extreme discourtesy" (Scarborough & Furumoto, 1987, p. 125). Ladd-Franklin's comments did not cause Titchener to change his exclusionary policy. Such actions caused some to view Titchener as a chauvinist.

However, Titchener's first doctoral candidate was Margaret Floy Washburn who, in June 1894, became the first woman ever to receive a doctorate in psychology. Titchener was so impressed by Washburn's dissertation, which explored the influence of visual imagery on judgments of tactile distance and direction, that he took the unusual step of submitting it to Wundt for publication in his journal *Philosophical Studies*. Washburn went on to make significant contributions to comparative psychology (see Chapter 11) and to be elected president of the APA in 1921.

Other women to whom Titchener taught his version of experimental psychology included Celestia Susannah Parrish (1855–1918). In 1893 Titchener, then a newly appointed professor at Cornell, accepted Parrish as a summer school student. During that summer, Parrish persuaded Titchener to furnish her with a tailor-made correspondence course that she could take while teaching at Randolph-Macon Woman's College (R-MWC) the following fall. Parrish, who took additional summer school classes from Titchener in 1894 and 1895, went on to establish the first psychology laboratory in the southern United States at R-MWC in Lynchburg, Virginia, and to chair the Department of Psychology and Pedagogy at the State Normal School in Georgia, which later became part of the University of Georgia (Rowe & Murray, 1979).

Including Washburn and Parrish, half of Titchener's first 12 doctorates were awarded to women, and of the 56 doctoral students he directed between 1894 and 1927, 19 were women. Titchener took women into his graduate program at a time when universities such as Harvard and Columbia would not. "More women completed their PhD degrees with him than with any other male psychologist of his generation…. Titchener also favored hiring women for academic positions when they were the best candidates for a job. In one case he did so, even over the objection of the dean" (Evans, 1991, p. 90).

So what was Titchener's attitude toward female psychologists? It has been suggested that during Titchener's tenure, Cornell had unusually liberal and advanced ideas about women to which Titchener was obliged to conform. However, given what we know about his domineering personality, it is difficult to imagine him conforming to anything he was not sympathetic toward. It seems more likely that Titchener's chauvinism tells us more about the era than the man.

As long as Titchener was healthy, his structuralism flourished; but when he died in 1927, of a brain tumor at the age of 60, structuralism essentially died with him. The reasons for the demise of structuralism will be discussed soon.

Structuralism's Goals and Methods

Titchener agreed with Wundt that psychology should study immediate experience—that is, consciousness. He defined *consciousness* as the sum total of mental experience at any given moment and *mind* as the accumulated experiences of a lifetime.

Titchener set as goals for psychology the determination of the what, how, and why of mental life. The *what* was to be learned through careful introspection. The goal here was a cataloging of the basic mental elements that account for all conscious experience. The *how* was to be an answer to the question of how the elements combine, and the *why* was to involve a search for the neurological correlates of mental events.

Unlike Wundt, who sought to *explain* conscious experience in terms of unobservable cognitive processes, Titchener sought only to *describe* mental experience. Titchener, accepting the positivism of Ernst Mach, believed that speculation concerning unobservable events has no place in science. It is interesting to note that Titchener took the same position toward the use of theory as B. F. Skinner (see Chapter 13) was to take many years later. For both, theorizing meant entering the world of metaphysics; and for both, science meant carefully describing what could be observed. However, whereas Skinner focused on observable behavior, Titchener focused on observable (via introspection) conscious events. It was the structure of the adult, normally functioning, human mind that Titchener wanted to describe, and thus he named his version of psychology **structuralism** (Titchener, 1898, 1899).

What Titchener sought was a type of periodic table for mental elements, what chemists had developed for the physical elements. Once the basic elements were isolated, the laws governing their combination into more complex experiences could be determined. Finally, the neurophysiological events correlated with mental phenomena could be determined. In 1899 Titchener defined the goal of structuralism as describing the *is* of mental life; he was willing to leave the *is for* for others to ponder.

Titchener's Use of Introspection. Titchener's use of introspection was more complicated than Wundt's. Typically, Wundt's subjects would simply report whether an experience was triggered by an external object or event. Titchener's subjects, however, had to search for the elemental ingredients of their experiences. Their job was to describe the basic, raw, elemental experiences from which complex cognitive experience was built. Titchener's subjects therefore had to be carefully trained to avoid reporting the *meaning* of a stimulus. The worst thing introspectionists could do would be to name the object of their introspective analysis. If the subjects (more accurately, observers) were shown an apple, for example, the task would be to describe hues and spatial characteristics (red, round, smooth, etc). Calling the object an apple would be committing what Titchener called the **stimulus error**. In this case, Titchener wanted his subjects to report sensations, not perceptions. Titchener said, "Introspecting through the glass of meaning … is the besetting sin of the descriptive psychologist" (1899, p. 291).

Toward the end of his career, Titchener modified his use of introspection (Evans, 1984). He found that allowing untrained observers to simply describe their phenomenological experience could be an important source of information. That is, taking a report of everyday experience at face value from a nonscientific "observer" could lead to important scientific discoveries. This is precisely the strategy employed by modern day phenomenological psychologists (for example, Pollio, Henley, & Thompson, 1997). Unfortunately, Titchener died before he and his students could fully explore this possibility.

Mental Elements

From his introspective studies, Titchener concluded that the elemental processes of consciousness consist of *sensations* (elements of perceptions), *images* (elements of ideas), and *affections* (elements of emotions). According to Titchener, an element could be known only by listing its attributes. The attributes of sensations and images (remnants of sensations) are quality, intensity, duration, clearness, and extensity. Extensity is the impression that a sensation or image is more or less spread out in space. Affections could have the attributes of quality, intensity, and duration but neither clearness nor extensity.

In practice, Titchener and his students concentrated most on the study of sensations, then on affections, and least of all on images. Titchener (1896) concluded that there are over 40,000 identifiable sensations, most of which are related to the sense of

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vision (about 30,000), with audition next (about 12,000), and then all the other senses (about 20). In his later years, Titchener changed the object of his introspective analysis from the elements themselves to their attributes (such as quality, intensity, and clearness) because it is only through its attributes that an element could be known (Evans, 1972).

Titchener did not accept Wundt's tridimensional theory of feeling. Titchener argued that feelings occur along only one dimension, not three, as Wundt had maintained. According to Titchener, feelings (affections) can be described only in terms of Wundt's pleasantness-unpleasantness dimension. He argued that the other two dimensions Wundt had suggested (tension-relaxation and excitement-calm) were really combinations of sensations and true feelings (pleasantness-unpleasantness). The *what* of psychology, then, included the sensations and images that were described in terms of quality, intensity, duration, clearness, and extensity, as well as the feelings that varied in terms of pleasantness.

Law of Combination. After Titchener had isolated the elements of thought, the next step was to determine *how* they combine to form more complex mental processes. In explaining how elements of thought combine, Titchener rejected Wundt's notions of apperception and creative synthesis in favor of traditional associationism. Titchener (1910) made the law of contiguity his basic law of association:

> Let us try … to get a descriptive formula for the facts which the doctrine of association aims to explain. We then find this: that, whenever a sensory or imaginal process occurs in consciousness, there are likely to appear with it (of course, in imaginal terms) all those sensory and imaginal processes which occurred together with it in any earlier conscious present.… Now the law of contiguity can, with a little forcing, be translated into our own general law of association. (pp. 378–379)

What about attention, the process that was so important to Wundt? For Titchener, attention was simply an attribute of a sensation (clearness). We do not make sensations clear by attending to them as Wundt had maintained. Rather, we say we have attended to them because they were clearer than other sensations in our consciousness. For Titchener, there is no underlying process of apperception that causes clarity; it is just that some sensations are more vivid and clear than others, and it is those that we *say* we attend to. The vague feelings of concentration and effort that accompany "attention" are nothing more than the muscle contractions that accompany vivid sensations. Consistent with his positivism, Titchener saw no need to postulate faculties, functions, or powers of the mind to explain the apparently rational process of attention. For him attention was clearness of sensation—period.

For the *how* of mental processes, then, Titchener accepted traditional associationism, thus aligning himself firmly with the British empiricists.

Context Theory of Meaning. What do we mean by the word *meaning?* Titchener's answer again involved associationism. Sensations are never isolated. In accordance with the law of contiguity, every sensation tends to elicit images of sensations that were previously experienced along with the sensation. A vivid sensation or group of sensations forms a *core*, and the elicited images form a *context* that gives the core meaning. A rattle may elicit images of the baby who used it, thus giving the rattle meaning to the observer. A picture of a loved one tends to elicit a wide variety of images related to the loved one's words and activities, thus giving the picture meaning. Even with such a rationalist concept as meaning, Titchener's **context theory of meaning** maintains his empiricist and associationist philosophy.

Neurological Correlates of Mental Events

Titchener referred to himself as a psychophysical parallelist concerning the mind-body relationship, and indeed much of his writing reflects that position. Occasionally, however, he appeared to

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embrace Spinozian double aspectism and at other times epiphenomenalism. Titchener's uncharacteristic equivocation in his position on the mind-body relationship reflected disinterest rather than shoddiness in his thinking. For him attempting to explain the mind-body relationship came dangerously close to metaphysical speculation, and that was foreign to his positivism. Essentially, Titchener believed that physiological processes provide a substrate that gives psychological processes a continuity they otherwise would not have. Thus, for Titchener, although the nervous system does not cause mental events, it can be used to explain some of their characteristics.

Ultimately then, neurophysiological processes are the *why* of mental life, if *why* is understood to mean a description of the circumstances under which mental processes occur.

We have seen that interest in the mind is as old as history itself, and the question of how the mind is related to bodily processes goes back at least as far as the early Greeks. Because both empiricists and rationalists alike believed the senses were the gateways to the mind, it is no surprise that sensory processes were among the first things science focused upon when it was applied to humans. From there it was but a short, logical step to looking at neural transmission, brain mechanisms, and finally conscious sensations.

The Decline of Structuralism

A case can be made that many of Wundt's ideas are alive and well in contemporary psychology, whereas little of substance from Titchener's system survives. The question is, What caused the virtual extinction of structuralism?

In many ways, the decline of the school of structuralism was inevitable. Structuralism was essentially an attempt to study scientifically what had been the philosophical concerns of the past. How does sensory information give rise to simple sensations, and how are these sensations then combined into more complex mental events? The major tool of the structuralists was introspection. This, too, had been inherited from the past. Although it was now used scientifically (that is, in a controlled situation), introspection was still yielding different results depending on who was using it and what they were seeking. Also, there was lack of agreement among highly trained introspectionists concerning the correct description of a given stimulus display.

Another argument against Titchener's introspection is that it was really *retrospection* because the event being reported had already occurred. Therefore, what was being reported was a memory of a sensation rather than the sensation itself. Also, it was suggested that one could not introspect on something without changing it—that is, that observation changed what was being observed.

Aside from the apparent unreliability of introspection, structuralism came under attack for other reasons. With its focus on understanding the normal, adult, human mind, structuralism excluded several developments that researchers outside the school were showing to be important. For example, animal behavior held little meaning for those hoping to find the basic elements of human consciousness. Likewise, the structuralists were not interested in the study of abnormal behavior even though Freud and others were making significant advances in understanding and treating individuals who were mentally ill. Similarly, the structuralists essentially ignored personality, learning, psychological development, and individual differences while major breakthroughs occurred in these areas. Also damaging was the structuralists' refusal to seek *practical* applications. Titchener insisted that he was seeking pure knowledge and was not concerned with the solution of everyday problems. For all these reasons, the school of structuralism was short-lived and essentially died with Titchener.

It was now time for a psychological school of thought that would deal with the important areas structuralism neglected, do so within the context of evolutionary theory, and use research techniques that were more reliable and valid than introspection. Titchener himself named this new school functionalism, a school that was concerned with the *what for* of the mind instead of the *what is* (1898, 1899). The development and characteristics of the school of functionalism will be the topics of the next two chapters.

EARLY GERMAN PSYCHOLOGY

Another misconception surrounding Wundt and the founding of psychology as an academic discipline arises if we do not fully consider the Zeitgeist of that period. If we need to pick just one patriarch, then given Wundt's efforts at Leipzig and the legion of students he trained surely he deserves the honor. But in so doing we must be careful not to overlook several of Wundt's contemporaries. Within 10–15 years of Wundt many other German universities had also created laboratories in psychology, several of which would produce an even more direct connection to modern psychology.

Franz Clemens Brentano: Act Psychology

Franz Clemens Brentano (1838–1917) was the grandson of an Italian merchant who had immigrated to Marienburg, the town in Germany where Brentano was born. Like Wundt, Brentano had many prominent relatives: some of his aunts and uncles wrote in the German romantic tradition, and his brother won a Nobel Prize for his work on intellectual history. When Brentano was 17, he began studying for the priesthood, but before being ordained he obtained his doctorate in philosophy from the University of Tubingen in 1862. His dissertation was titled "On the Manifold Meaning of Being According to Aristotle." Two years later, he was ordained a priest and in 1866 became a teacher at the University of Würzburg. Brentano eventually left the church because of his disagreement with the doctrine of the pope's infallibility, his favorable attitude toward Comte's positivism, his criticisms of Scholasticism, and his desire to marry (which he eventually did, twice).

In 1874 he was appointed professor of philosophy at the University of Vienna, where he enjoyed his most productive years. Brentano published his most influential work—*Psychology From an Empirical Standpoint* (1874/1973)—the same year that Wundt published his *Principles of Physiological Psychology*. In 1894 pressure from the church forced Brentano to leave Vienna and move to Florence. Italy's entrance into World War I ran contrary to Brentano's pacifism, and he protested by moving to Zurich, where he died in 1917.

Brentano agreed with Wundt that the search for mental elements implied a static view of the mind that was not supported by the facts. Brentano disagreed with Titchener over the importance of knowing the physiological mechanisms behind mental events. According to Brentano, the important thing about the mind was not what it was made of but what it did. In other words, Brentano felt that the proper study of the mind should emphasize the mind's *processes* rather than its contents or biology.

Brentano's views came to be called **act psychology** because of his belief that mental processes are aimed at performing some function. Among the mental acts, he included judging, recalling, expecting, inferring, doubting, loving, hating, and hoping. Furthermore, each mental act refers to an object outside itself. For example, *something* is judged, recalled, expected, loved, hated, and so

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Franz Clemens Brentano

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forth. Brentano used the term **intentionality** to describe the fact that every mental act incorporates something outside itself. Thus, Brentano clearly distinguished between seeing the color red and the color red that is seen. Seeing is a mental act, which in this case has as its object the color red. Acts and contents (objects) are inseparable; every mental act intends (refers to, encompasses) an object or event that is the content of the act. Brentano did not mean "intention" or "purpose" by the term *intentionality*; he simply meant that every mental act intends (refers to) something outside itself.

To study mental acts and intentionality, Brentano used a form of introspection that Wundt and Titchener (initially) found to be problematic. The careful, controlled analytic introspection designed to report the presence or absence of a sensation or to report the elements of experience was of no use to Brentano. Rather, he used the very type of **phenomenological methods**—the study of intact, meaningful experiences—that Titchener allowed into his program only toward the end of his life. Brentano, even more than Wundt, followed in the tradition of German rationalism. For him the mind is active, not passive as the British empiricists, the French sensationalists, and the structuralists had believed.

Brentano wrote very little, favoring oral communication. His considerable mark on psychology continued through those whom he influenced personally; and as we will see, there were many. One of Brentano's students who later became famous was Sigmund Freud, who took his only nonmedical courses from Brentano. Although Freud is most associated with clinical psychology, he held a complete theory of human nature that reflected much from Brentano (Fancher, 1977). Likewise, both Gestalt psychology and elements of modern existential psychology can be traced to Brentano.

Smith (1994) makes the case that Brentano's influence on philosophy and psychology was so pervasive that "A table of Brentano's students … would … come close to embracing all of the most important philosophical movements of the twentieth century" (p. 21). As just one last example, Brentano's notion of intentionality remains at the center of modern cognitive science and our understanding of artificial intelligence (for example, Searle, 1980, 1983, as we will see in Chapter 19).

Carl Stumpf and Berlin

Carl Stumpf (1848–1936) was born in Wiesentheid, Bavaria, to prominent parents. By the age of seven, Carl was playing the violin, and soon mastered five additional musical instruments and was composing music. A sickly child, Carl was first tutored at home by his grandfather. He eventually enrolled at the University of Würzburg, where he was greatly influenced by Brentano. From the University of Würzburg, Stumpf went on to the University of Göttingen, where he earned his doctorate in 1868. He then returned to Würzburg and again attended Brentano's lectures. Deciding to become a priest, Stumpf entered the Catholic seminary at Würzburg in 1869. However, like Brentano, he couldn't accept the newly announced dogma of papal infallibility, so he returned to Göttingen for postdoctoral study. Following this, Stumpf held several academic positions, but in 1893 he accepted the chair of psychology at the University of Berlin—one of Germany's most prestigious schools. This appointment both established psychology as an independent discipline within the university, and cemented its academic credibility. At Berlin, Stumpf created a psychological laboratory (later to become a "psychological institute") that was soon to rival Wundt's at Leipzig.

As an experimental psychologist, Stumpf was primarily interested in acoustical perception. He had published his influential two-volume *Psychology of Tone* (1883, 1890) before his appointment at Berlin, and he continued to pursue the topic in his new laboratory. However, he had many other interests as well: "As a theoretical psychologist, he was concerned with questions of emotional and perceptional psychology, scientific theory, research methodology, and the theory of evolution" (Sprung & Sprung, 2000, p. 57). In addition, Stumpf accepted the intimate relationship between psychology and philosophy, and he spent considerable time attempting to make the scholarly community understand how experimental psychology could advance the longstanding questions of mind.

Like Brentano, Stumpf argued that mental events should be studied as meaningful units, just as they occur to the individual, and need not be broken down for further analysis. In other words, for Stumpf the proper object of study for psychology was mental *phenomena*, not conscious elements. This stance led to the methods that were to become the cornerstone of the later school of Gestalt psychology (see Chapter 14). In fact, the chair that Stumpf occupied at the University of Berlin for 26 years was passed on to the great Gestalt psychologist Wolfgang Köhler. The other two founders of Gestalt psychology, Max Wertheimer and Kurt Koffka, also studied with Stumpf.

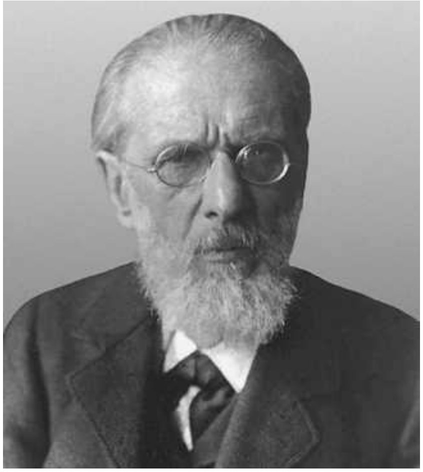
Clever Hans. Stumpf played a prominent role in the famous case of Clever Hans, a horse owned and trained by Wilhelm von Osten of Berlin. Hans could correctly solve arithmetic problems by tapping his hoof or shaking his head the appropriate number of times, and as a result the horse became a celebrity. Thousands of people came to see it perform. There were allegations of fraud, and Von Osten, a genuinely honest man, appealed to the Berlin Board of Education to resolve the matter. The board appointed a committee under the direction of Stumpf, but it initially was unable to determine how Hans was able to correctly answer the questions.

In a second investigation, Stumpf assigned Oskar Pfungst, a graduate student, to investigate Hans's performance. Using what Boakes called "a textbook illustration of how to apply experimental methods to a psychological problem" (1984, p. 78), Pfungst found that when the questioner was out of Hans's sight, the horse's performance fell to chance level. It became clear that Clever Hans was responding to very subtle cues unintentionally furnished by the questioner, such as unconsciously nodding his head when Hans had made the appropriate number of responses.

Pfungst was able to replicate Hans's original level of performance by himself supplying subtle cues to the horse. He was even able to produce the same sort of effect—an ignorant responder gleaning the correct answer by closely observing an audience in the know—using other students from the Berlin lab. Asking the audience to think of a number, Pfungst would slowly tap out his response, stopping when he detected the same sort of unconscious bodily cues that Clever Hans had learned to respond to.

Subsequently, several other cases of apparent high-level intellectual feats by animals have also been explained as responses to cues provided consciously or unconsciously by their trainers. Such communication is now referred to as the **Clever Hans phenomenon** (Zusne & Jones, 1989). For an interesting account of the details surrounding the case of Clever Hans, including Pfungst's replication of the Clever Hans phenomenon with humans, see Candland (1993) or even Pfungst (1911/1965).

Robert Rosenthal (for example, 1966, 1967) later discussed the implications of the Clever Hans phenomenon for psychological experimentation in general. Rosenthal found that an experimenter may provide subtle cues that unwittingly convey his or her expectations of the experimental outcome to the experimental participants, thus influencing the outcome of the experiment. Such an influence on



Carl Stumpf

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an experiment's outcome is called experimenter bias. One way to minimize this effect is to use a double blind procedure where neither the experimenter nor the participant knows into which experimental condition the participant has been placed.

Edmund Husserl and Phenomenology

Edmund Husserl (1859–1938) was born in what today would be the Czech Republic. At 17, he entered the university at Leipzig, and studied under Wundt. Later, he worked with Brentano from 1884 to 1886 and then Stumpf at Berlin, to whom he dedicated his book *Logical Investigations* (1900–1901). Although interested in philosophy and psychology, for much of this time Husserl focused on mathematics and logic. He held university positions at Halle, then Göttingen, before accepting the chair at Freiburg in 1916. Born to Jewish parents, Husserl was denied all academic privileges following the Nazi rise in Germany. And in 1939 his extensive writings had to be smuggled out of the country.

Husserl accepted Brentano's concept of intentionality, according to which mental acts are functional in the sense that they are directed at something outside themselves. For Brentano, mental acts are the means by which we make contact with the physical world. For Husserl, studying intentionality results in only one type of knowledge—that of the person turned outward to the environment. Equally important is the knowledge gained through studying the person turned inward. The latter study examines subjective experience as it occurs, without the need to relate it to anything else.

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Edmund Husserl

For Husserl then, there are at least two types of methods: one that focuses on intentionality and one that focuses on whatever processes a person experiences subjectively. For example, the former type would ask what external object the act of seeing intends, whereas the latter would concentrate on a description of the pure experience of seeing. Both methods focus on phenomenological experience, but because the latter focuses on the essences of mental processes, Husserl referred to it as **pure phenomenology**. When the term *phenomenon* is used to describe a mental event, it refers to a whole, intact, meaningful experience and not to fragments of conscious experiences such as isolated sensations. In this sense, Wundt (as an experimentalist) and the earlier Titchener were not phenomenologists, whereas Brentano, Stumpf, and Husserl were.

The Methods of Natural Science. Husserl thought that those who believe that psychology should be an experimental science made a mistake by taking the natural sciences as their model. Jennings (1986) explains Husserl's reasoning:

> Historically, psychology adopted the experimental methods used by the physical sciences (despite the fact that mental events lack the physical tangibility of "natural" events) because it hoped to claim the same authoritative knowledge enjoyed by the physical sciences.... However, psychology

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> could not simply adopt the experimental method without also adopting its implicit naturalistic perspective and the philosophical problems inherent in that belief system. First, the new scientific psychology actively disallowed any study of consciousness by direct "seeing" of what consciousness is like because such a procedure was regarded as unscientific "introspection." Second, and more important, psychologists were forced to ground the nonnatural phenomena of consciousness in physical events that could be studied experimentally. This problem is analogous to a fool who tries putting 12 oranges into an egg carton because the egg carton did such a great job of neatly ordering eggs. Instead of finding a new container suitable for holding oranges (the phenomenological study of consciousness), the fool cuts and tapes the egg carton until the oranges will fit. Or, worse yet, the fool mangles the oranges themselves in a misguided effort to force them into the egg carton (the experimental study of consciousness). (p. 1234)

Husserl did not deny that an experimental psychology was possible; he simply said that it must be preceded by a careful, rigorous, phenomenological analysis. Husserl believed that it was premature to perform experiments on perception, memory, and feelings without first knowing the essence (the ultimate nature) of these processes. Without such knowledge, the experimenter does not know how the very nature of what he or she is studying may bias what is found or how the experiences are initially organized.

Husserl's Phenomenology. Husserl's goal was to create a taxonomy of the mind. He wanted to describe the **mental essences** by which humans experience themselves, other humans, and the world. Husserl believed strongly that a description of such essences must *precede* any attempt to understand the interactions between humans and their environment and any science of psychology. Indeed, he believed that such an understanding was basic to *any* science because all sciences ultimately depend on human mental attributes.

Husserl's position differed radically from that of the structuralists in that Husserl sought to examine *meanings* and essences, not mental elements, via introspection. He and his subjects would thus commit the dreaded stimulus error. Husserl also differed from his teachers Brentano and Stumpf by insisting on a pure phenomenology with little or no concern for determining the relationship between subjective experience and the physical world.

Brentano, Stumpf, and Husserl all insisted that the proper subject matter for psychology was intact, meaningful, psychological experiences. As Boring (1950, p. 368) quipped, "phenomenology was in the air," and the psychological schools that would soon eclipse voluntarism and structuralism would reflect this approach. As previously noted, such views would flourish in Gestalt psychology and existential psychology. Martin Heidegger, one of the most famous modern existential thinkers, dedicated his book *Being and Time* (1927) to Husserl—alas, subsequent editions after the Nazi rise to power omitted that dedication—and we will have more to say about Husserl and Heidegger in Chapter 17.

Oswald Külpe: The Würzburg School

Oswald Külpe (1862–1915) was interested in many things, including music, history, philosophy, and psychology. He was born of German parents in Russian Latvia, and wrote five books on philosophy for the lay reader, including one on Kant. Around 1881, he was studying history at the University of Leipzig when he attended Wundt's lectures and became interested in psychology.

Under Wundt's supervision, Külpe received his doctorate in 1887, and he remained Wundt's assistant for the next eight years. Külpe dedicated his book *Outlines of Psychology* (1893/1909) to Wundt. During his time as Wundt's assistant,

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Oswald Külpe

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Külpe met and roomed with Titchener, and although the two often disagreed, they maintained the highest regard for one another. In fact, Titchener later translated several of Külpe's works into English. In 1894 Külpe moved to the University of Würzburg, where for the following 15 years he did his most influential work in psychology. In 1909 he left Würzburg and went to the University of Bonn and then to the University of Munich. After Külpe left Würzburg, his interest turned more and more to philosophy. He was working on epistemological questions when he died of influenza on December 30, 1915. He was only 53 years old.

Imageless Thought. Although starting out very much in the Wundtian camp, Külpe became one of Wundt's dissidents—indeed, rivals. Külpe disagreed with Wundt and Titchener that all thought had to have a specific referent—that is, a sensation, image, or feeling. Külpe believed that some thoughts were *imageless*. Furthermore, he disagreed with Wundt's contention that the higher mental processes (like thinking) could not be studied experimentally, and he set out to do so using what he called systematic experimental introspection. This technique involved giving subjects problems to solve and then asking them to report on the mental operations they engaged in to solve them. In addition, subjects were asked to describe the types of thinking involved at different stages of problem solving. They were asked to report their mental experiences while waiting for the problem to be presented, during actual problem solving, and after the problem had been solved.

Külpe's more elaborate introspective technique indicated that there were indeed **imageless thoughts** such as searching, doubting, confidence, and hesitation. In 1901 Karl Marbe, one of Külpe's colleagues, published a study describing what happened when subjects were asked to judge weights as heavier or lighter than a standard weight. Marbe was interested not in the accuracy of the judgments but in *how* the judgments were made. Subjects reported prejudgment periods of doubt, searching, and hesitation, after which they simply made the judgments. Marbe concluded that Wundt's elements of sensations, images, and feelings were not enough to account for the act of judging. There appeared to be a mental act of judging that was independent of what was being judged. Marbe concluded that such an act was imageless. Incidentally, these pure (imageless) processes, such as judging, were the very things that Husserl was seeking to describe with his pure phenomenology.

Titchener and his students responded to the challenge to his version of psychology by the Würzburg school in a series of studies published between 1907 and 1915. In these studies it was claimed that the apparent existence of imageless thought was due to shoddy introspective methods. The debate was not so much resolved, as it just ended following Külpe's death and Titchener's eventual interest in alternative methods.

Mental Set. Some of the most influential work to come out of the **Würzburg school** was that on *Einstellung*, or **mental set**. It was found that focusing subjects on a particular problem created a *determining tendency* that persisted until the problem was solved. Furthermore, although this tendency or set was operative, subjects were unaware of it; that is, it

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operated on the unconscious level. For example, a bookkeeper can balance the books without being aware of the fact that he or she is adding or subtracting. Mental sets could similarly be induced experimentally by instructing subjects to perform different tasks or solve different problems. Mental sets could also result from a person's past experiences.

William Bryan, one of the American students working in Külpe's laboratory, provided an example of an experimentally induced set. Bryan showed cards containing various nonsense syllables written in different colors and in different arrangements. Subjects who were instructed to attend to the colors were afterward able to report the colors present but could not report the other stimuli. Conversely, subjects instructed to attend to the syllables could report them with relative accuracy but could not accurately report the colors. It appeared that instructions had directed the subjects' attention to certain stimuli and away from others. This profoundly demonstrated that environmental stimuli do not automatically create sensations that become conscious images. Rather, the process of attention determines which sensations will and will not be experienced. This finding was in accordance with Wundt's view of attention but not with Titchener's. As for Bryan, he would serve as President of the American Psychological Association in 1903, and eventually as President of Indiana University.

Narziss Ach, also working in Külpe's laboratory, demonstrated the type of mental set derived from experience. Ach found that when the numbers 7 and 3 were flashed rapidly and subjects had not been instructed to respond in any particular way, the most common response was to say "ten." Ach's explanation was that the mental set to add was more common than the mental sets to subtract, multiply, or divide, which would have resulted, respectively, in the responses "four," "twenty-one," and "two point three."

Other Findings of the Würzburg School. In addition to showing the importance of mental sets in problem solving, members of the Würzburg school showed that problems have motivational properties. Somehow, problems caused subjects to continue to apply relevant mental operations until a solution was attained. The motivational aspect of problem solving was to be emphasized later by the Gestalt psychologists, such as Max Wertheimer, who wrote his doctoral dissertation under Külpe's supervision.

In opposition to Wundt, the Würzburg school showed that the higher mental processes could be studied experimentally. The school also claimed that associationism was inadequate for explaining the operations of the mind and challenged the voluntarists' and the structuralists' narrow use of the introspective method. Members of the Würzburg school made the important distinction between thoughts and thinking, between mental contents and mental acts. In elaborating these distinctions, members of the school remained aligned with Brentano and apart from Wundt and especially Titchener. Like Brentano, the members of the Würzburg school were interested in how the mind worked instead of what static elements it contains.

Controversies with the Würzburg school did much to promote the collapse of both voluntarism and structuralism. Was there imageless thought or not? Was it possible, as some maintained, that some individuals had imageless thought and others did not? If so, how would this affect the search for universal truths about the mind? How should introspection be properly used? Could it be directed only at static contents of the mind, or could it be used to study the dynamics of the mind? This questioning of the validity of introspection as a research tool also did much to launch the school of behaviorism (see Chapter 12), whereas the legacy of Würzburg remains with us as cognitive psychology.

Hermann Ebbinghaus and Memory

Hermann Ebbinghaus (1850–1909) was born in the industrial city of Barmen, near Bonn. His father was a wealthy paper and textile merchant. He studied classical languages, history, and philosophy at the Universities of Bonn, Halle, and Berlin before receiving his doctorate from Bonn in 1873. He wrote his dissertation on Hartmann's philosophy of the unconscious. He spent the next 3 1/2 years traveling through England and France. In London, he bought and read a copy of Fechner's *Elements of Psychophysics*, which deeply impressed him. Ebbinghaus later dedicated his book *Outline of Psychology* (1902) to Fechner, of whom he said, "I owe everything to you."

Ebbinghaus began his research in his home in Berlin in 1878, and his early studies were written and offered as support of his successful application to be a lecturer in philosophy at the University of Berlin. Ebbinghaus's research culminated in a monograph titled *On Memory: An Investigation in Experimental Psychology* (1885/1964), which marked a turning point of psychology. It was the first time that the processes of learning and memory had been studied *as* they occurred rather than after they had occurred. Furthermore, they were investigated *experimentally*. As testimony to Ebbinghaus's thoroughness, many of his findings are still cited in modern psychology textbooks. Hoffman, Bringmann, Bamberg, and Klein (1986) list eight major conclusions that Ebbinghaus reached about learning and memory; most are still valid today and are being expanded by current researchers. Ebbinghaus's *Principles of Psychology* (1897) was widely used as an introductory psychology text, as was his *Outline of Psychology* (1902). It was the *Outline* that began with Ebbinghaus's famous statement, "Psychology has a long past, but only a short history."

Along with Hering, Stumpf, Helmholtz, and others, Ebbinghaus established psychology's second experimental journal, *Journal of Psychology and Physiology of the Sense Organs*, which broke Wundt's monopoly on the publishing of results from psychological experiments. Ebbinghaus was also the first to publish an article on the testing of schoolchildren's intelligence. He devised a sentence-completion task for the purpose, and it later became part of the Binet–Simon scale of intelligence (Hoffman et al., 1986). His student William Stern continued such work and is credited with developing the intelligence quotient (IQ).

Hermann Ebbinghaus

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Although it was Stumpf and not Ebbinghaus that was given the chair at Berlin, history has been more kind. His two immensely popular textbooks continued to be revised long after his death. And a wide variety of modern interests, from intelligence testing, to the capacity of consciousness, to primacy and recency effects, as well as many matters in learning and memory, can all be directly traced to his ideas.

In 1909 Ebbinghaus developed pneumonia; he died on February 26 at the age of 59. A short history, indeed.

Nonsense Material. To study learning as it occurred, Ebbinghaus needed material that had not been previously experienced. For this, he created a pool of 2,300 "nonsense syllables." Hoffman et al. (1986) point out that the standard discussion of Ebbinghaus's syllables is incorrect. It was not his syllables that had little or no meaning; it was a series of syllables that was essentially meaningless. That is, referring to Ebbinghaus's syllables as nonsense syllables is a misnomer. Many of Ebbinghaus's

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syllables were actual words, and many others closely resembled words. From the pool of 2,300 syllables, Ebbinghaus chose a series to be learned. The series usually consisted of 12 syllables, although he varied the size of the group in order to study rate of learning as a function of the amount of material to be learned. Keeping the syllables in the same order and using himself as a subject, he looked at each syllable for a fraction of a second. After going through the list in this fashion, he paused for 15 seconds and went through the list again. He continued in this manner until he could recite each syllable without making a mistake, at which point mastery was said to have occurred.

At various time intervals following mastery, Ebbinghaus relearned the group of syllables. He recorded the number of exposures it took to relearn the material and subtracted that from the number of exposures it took to initially learn the material. He called the difference between the two **savings.** By plotting savings as a function of time, Ebbinghaus created psychology's first retention curve. He found that forgetting was most rapid during the first few hours following a learning experience and relatively slow thereafter. And he found that if he *overlearned* the original material (if he continued to expose himself to material after he had attained mastery), the rate of forgetting was considerably reduced. Ebbinghaus also studied the effect of *meaningfulness* on learning and memory. For example, he found that it took about 10 times as many exposures to learn 80 random syllables as it did to learn 80 successive syllables from Byron's *Don Juan*.

Finally, Ebbinghaus found that "*with any considerable number of repetitions* a suitable distribution of them over a space of time is decidedly more advantageous than the massing them at a single time" (1885/1964, p. 89). In other words, in learning lists of syllables, distributed practice is more efficient than massed practice.

G. E. Müller. Like Ebbinghaus several of **Georg Elias Müller's (1850–1934)** findings on memory remain with us. For example, Müller found that subjects spontaneously organize materials to be remembered into meaningful patterns (see Bousfield, 1953), and he was the first to document retroactive inhibition, that is, that new learning can cause forgetting of previously learned items.

Müller was born not far from Leipzig. After completing his degree with Lotze, Müller accepted a position at Göttingen where he remained for 40 years. He has been called the "third pillar" of experimental psychology (after Fechner and Wundt); Boring (1935, 1950) labels him a pioneer and a giant; and Gestalt psychologist Kurt Lewin (1937) said he held the highest rank within the "pyramid of psychology." Müller's students include several perceptual researchers that would flourish during the tenure of Gestalt psychology, and several women.

In addition to his studies of memory, Müller became the leading researcher in psychophysics following the death of Fechner. Much of his work was in the area of color vision, where he supported Hering's views over those of Helmholtz. Müller was a master methodologist who created novel instruments for use in his psychological experiments. One famous example is the memory drum—a device designed to standardize stimulus presentation during memory research.

Because of the empirical nature of their experimental work, researchers such as Müller and Ebbinghaus have sometimes been misconstrued as following in the empiricist tradition. Hoffman et al. (1986; see also Boring, 1950) indicate that this simply is not true. Ebbinghaus, for example, most often quoted Herbart, and the topics that were of most interest to him—such as meaning, imagery, and individual differences in cognitive styles—followed in the tradition of rationalism, not empiricism.

Hans Vaihinger: As If

In 1911 **Hans Vaihinger (1852–1933)** published his influential book *The Philosophy of "As If": A System of the Theoretical, Practical and Religious Fictions of Mankind*. In his book, Vaihinger sided with the Machian positivists, saying that all we ever experience directly are sensations and the relationships among sensations; therefore, all we can be certain of are sensations. It was Vaihinger's next step, however, that made his position unusual. According to Vaihinger, societal living requires that we give meaning to our sensations, and we do that by inventing terms, concepts, and theories and then acting "as if" they were true. That is, although we can never know if our fictions correspond to reality, we act as if they do. This tendency to invent meaning, according to Vaihinger, is part of human nature:

> Just as [the clam] when a grain of sand gets beneath its shining surface, covers it over with a self-produced mass of mother-of-pearl, in order to change the insignificant grain into a brilliant pearl, so, only still more delicately, the psyche, when stimulated, transforms the material of sensation which it absorbs into shining pearls of thought. (Vaihinger, 1911/1952, p. 7)

For Vaihinger, the term *fiction* was not derogatory. Because a concept is false, in the sense that it does not refer to anything in physical reality, does not mean that it is useless:

> The principle of fictionalism is as follows: An idea whose theoretical untruth or incorrectness, and therefore its falsity, is admitted, is not for that reason practically valueless and useless; for such an idea, in spite of its theoretical nullity may have great practical importance. (Vaihinger, 1911/1952, p. viii)

Everyday communication would be impossible without fictional words and phrases, according to Vaihinger. Science would be impossible without such fictions as matter and causality. Many believe that science actually describes physical reality but, said Vaihinger, that is forever impossible: "We must … regard it as a pardonable weakness on the part of science if it believes that its ideas are concerned with reality itself" (1911/1952, p. 67). Mathematics would be impossible without such fictions as zero, imaginary numbers, infinity, and the infinitesimal. Concepts of morality and jurisprudence would be impossible without such fictions as freedom and responsibility. The fiction of freedom is especially vital to societal living:

> We encounter at the very threshold of these fictions one of the most important concepts ever formed by man, the idea of *freedom*; human actions are regarded as free, and therefore as "responsible" and contrasted with the "necessary" course of natural events. We need not here recapitulate the familiar antinomies found in this contradictory concept; it not only contradicts observation which shows that everyone obeys unalterable laws, but is also self-contradictory, for an absolutely free, chance act, resulting from nothing, is ethically just as valueless as an absolutely necessary one. In spite of all these contradictions, however, we not only make use of this concept in ordinary life in judging moral actions, but it is also the foundation of criminal law. Without this assumption punishment inflicted for any act would, from an ethical standpoint, be unthinkable, for it would simply be a precautionary measure for protecting others against crime. Our judgment of our fellowmen is likewise so completely bound up with this

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Hans Vaihinger

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> ideational construct that we can no longer do without it. In the course of their development, men have formed this important construct from immanent necessity, because only on this basis is a high degree of culture and morality possible. There is nothing in the real world corresponding to the idea of liberty, though in practice it is an exceedingly necessary fiction. (1911/1952, p. 43)

There is a similarity between Vaihinger's fictionalism and the philosophy of pragmatism (see, for example, William James in Chapter 11). Both fictionalism and pragmatism evaluate ideas in terms of their usefulness. However, Vaihinger believed that there was an important difference between his position and pragmatism. For the pragmatist, he said, truth and usefulness were inseparable. If an idea was useful, it was considered true: "An idea which is found to be useful in practice proves thereby that it is also true in theory" (Vaihinger, 1911/1952, p. viii). Vaihinger rejected this notion. For him a concept could be demonstrably false and still be useful. For example, although the concept of free will is demonstrably false, there may be benefits from acting as if it were true.

We will see in Chapter 16 that Alfred Adler made Vaihinger's fictionalism an integral part of his theory of personality. Also, George Kelly (see Chapter 17) noted a similarity between his thinking and Vaihinger's.

SUMMARY

Wundt was the founder of both experimental psychology as a separate discipline and the school of voluntarism. One of Wundt's goals was to discover the elements of thought using experimental introspection. A second goal was to discover how these elements combine to form complex mental experiences. Wundt found that there are two types of basic mental experiences: sensations and feelings. Wundt distinguished among sensations, which are basic mental elements; perceptions, which are mental experiences given meaning by past experience; and apperceptions, which are mental experiences that are the focus of attention. Because humans can focus their attention on whatever they wish, Wundt's theory was referred to as voluntarism.

Wundt believed that reaction time could supplement introspection as a means of studying the mind. Following techniques developed by Donders, Wundt presented tasks of increasing complexity to his subjects and noted that more complex tasks resulted in longer reaction times. Wundt believed that the time required to perform a complex mental operation could be determined by subtracting the times it took to perform the simpler operations of which the complex act consists. Wundt eventually gave up his reaction-time studies because he found reaction time to be an unreliable measure.

In keeping with the major thrust of voluntarism, Wundt claimed that physical events could be explained in terms of antecedent events but psychological events could not be. Unlike the behavior of physical objects, psychological events can be understood only in terms of their purpose. The techniques used by the physical sciences are therefore inappropriate for psychology. Volitional acts can be studied only after the fact by studying their outcomes. In his 10-volume *Völkerpsychologie*, Wundt considered such topics as social customs, religion, myths, morals, art, law, and language.

Titchener created the school of structuralism at Cornell University. He set as his goal the learning of the what, how, and why of mental life. The what consisted of determining the basic mental elements, the how was determining how the elements combined, and the why consisted of determining the neurological correlates of mental events. His introspectionists had to be carefully trained so that they would not commit the stimulus error. According to Titchener, sensations and images could vary in terms of quality, intensity, duration, clearness, and extensity. He found evidence for over 40,000 separate mental elements. Following in the empirical-associationistic tradition, Titchener said that sensations always stimulate the memories of events that were previously experienced along with those sensations, and these memories give the sensations meaning. There were a number of fundamental differences between Wundt's voluntarism and Titchener's structuralism. Many factors led to the downfall of structuralism: examples are the unreliability of introspection and the ignoring of psychological development, abnormal behavior, personality, learning, individual differences, evolutionary theory, and practicality.

Brentano believed that mental acts should be studied rather than mental elements, and therefore his position is referred to as act psychology. Brentano used the term *intentionality* to describe the fact that a mental act always encompasses (intends) something external to itself. Like Brentano, Stumpf believed that psychology should be directed at intact, meaningful experience instead of the elements of thought. Stumpf had a major influence on those individuals who later created the school of Gestalt psychology.

Husserl believed that before scientific psychology would be possible, a taxonomy of the mind was required. To create such a taxonomy, pure phenomenology would be used to explore the essence of subjective experience. According to Husserl, it did not make sense to perform experiments involving such processes as perception, memory, or judgment without first knowing the essences of those processes. The mind itself, he said, must be understood before we can study how the mind responds to objects external to it.

Külpe found that the mind possesses processes—not just sensations, images, and feelings—and that some of these processes are imageless. Examples of imageless thoughts include searching, doubting, and hesitating. Külpe and his colleagues at Würzburg found that a mental set, which could be created either through instructions or through personal experience, provided a determining tendency in problem solving. They also found that once a mental set had been established, humans could solve problems unconsciously.

Ebbinghaus, like members of the Würzburg school, demonstrated that Wundt had been wrong in saying that the higher mental processes could not be studied experimentally. Using "nonsense" material, both Ebbinghaus and Müller systematically studied learning and memory so thoroughly that their works are still cited in psychology texts.

Vaihinger contended that because sensations are all that we can be certain of, all references to so-called physical reality must be fictional. All societal living is based on fictions that can be evaluated only in terms of their usefulness. Vaihinger's fictionalism was distinguished from pragmatism because, for the pragmatist, the extent to which an idea is useful it is also considered true. For Vaihinger, however, ideas are often demonstrably false but still useful.

DISCUSSION QUESTIONS

1. What is meant by a school of psychology?
2. Why was the school of psychology created by Wundt called voluntarism?
3. How did Wundt differentiate between mediate and immediate experience?
4. Discuss Wundt's use of introspection.
5. For Wundt, what were the elements of thought, and what were their attributes? Include in your answer a discussion of Wundt's tridimensional theory of feeling.
6. How did Wundt distinguish between psychological and physical causation?
7. What did Wundt mean when he said that volitional acts are creative but not free?
8. Define the terms *sensation*, *perception*, *apperception*, and *creative synthesis* as they were used in Wundt's theory.

9. Summarize how Wundt used reaction time in an effort to determine how long it took to perform various mental operations. Why did Wundt abandon his reaction-time research?
10. Why did Wundt think it necessary to write his *Völkerpsychologie*? What approach to the study of humans did it exemplify?
11. For Titchener, what were the goals of psychology?
12. What did Titchener believe would be the ultimate "why" of psychology?
13. Compare and contrast Wundt's view of psychology with Titchener's.
14. List the reasons for the decline of structuralism. Include in your answer the various criticisms of introspection.
15. Summarize Brentano's act psychology.
16. What did Brentano mean by *intentionality*?
17. What was the significance and legacy of Stumpf's program at Berlin?
18. What did Husserl mean by *pure phenomenology*? Why did he believe that an understanding of the essence of subjective experience must precede scientific psychology?
19. How did the Würzburg school differ from Wundt's voluntarism?
20. What did Külpe mean by imageless thought? *Mental set*?
21. Discuss the significance of Ebbinghaus's work to the history of psychology.
22. What did Vaihinger mean by his contention that without fictions, societal life would be impossible? Describe the difference between pragmatism and fictionalism.

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GLOSSARY

Act psychology The name given to Brentano's brand of psychology because it focused on mental operations or functions. Act psychology dealt with the interaction between mental processes and physical events.

Brentano, Franz Clemens (1838–1917) Believed that introspection should be used to understand the functions of the mind rather than its elements. Brentano's position came to be called act psychology. (*See also* **Act psychology**.)

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Clever Hans phenomenon The creation of apparently high-level intelligent feats by nonhuman animals by consciously or unconsciously furnishing them with subtle cues that guide their behavior.

Context theory of meaning Titchener's contention that a sensation is given meaning by the images it elicits. That is, for Titchener, meaning is determined by the law of contiguity.

Creative synthesis The arrangement and rearrangement of mental elements that can result from apperception.

Donders, Franciscus Cornelius (1818–1889) Used reaction time to measure the time it took to perform various mental acts.

Ebbinghaus, Hermann (1850–1909) The first to study learning and memory experimentally.

Elements of thought According to Wundt and Titchener, the basic sensations from which more complex thoughts are derived.

Feelings The basic elements of emotion that accompany each sensation. Wundt believed that emotions consist of various combinations of elemental feelings. (*See also* **Tridimensional theory of feeling.**)

General impression The thought a person has in mind before he or she chooses the words to express it.

Husserl, Edmund (1859–1938) Called for a pure phenomenology that sought to discover the essence of subjective experience. (*See also* **Pure phenomenology**.)

Imageless thoughts According to Külpe, the pure mental acts of, for example, judging and doubting, without those acts having any particular referents or images.

Immediate experience Direct subjective experience as it occurs.

Intentionality Concept proposed by Brentano, according to which mental acts always intend something. That is, mental acts embrace either some object in the physical world or some mental image (idea).

Introspection Reflection on one's subjective experience, whether such reflection is directed toward the detection of the presence or absence of a sensation (as in the case of Wundt and Titchener) or toward the detection of complex thought processes (as in the cases of Brentano, Stumpf, Külpe, Husserl, and others).

Külpe, Oswald (1862–1915) Applied systematic, experimental introspection to the study of problem solving and found that some mental operations are imageless.

Mediate experience Experience that is provided by various measuring devices and is therefore not immediate, direct experience.

Mental chronometry The measurement of the time required to perform various mental acts.

Mental essences According to Husserl, those universal, unchanging mental processes that characterize the mind and in terms of which we do commerce with the physical environment.

Mental set A problem-solving strategy that can be induced by instructions or by experience and that is used without a person's awareness.

Müller, George Elias (1850–1934) Considered one of the early pioneers or giants of experimental psychology, Müller worked in psychophysics, perception, and memory.

Perception Mental experience that occurs when sensations are given meaning by the memory of past experiences.

Phenomenological methods The type of introspective analysis that focuses on intact mental phenomena rather than on isolated mental elements.

Principle of contrasts According to Wundt, the fact that experiences of one type often intensify opposite types of experiences, such as when eating something sour will make the subsequent eating of something sweet taste sweeter than it would otherwise.

Principle of the heterogony of ends According to Wundt, the fact that goal-directed activity often causes experiences that modify the original motivational pattern.

Principle toward the development of opposites According to Wundt, the tendency for prolonged experience of one type to create a mental desire for the opposite type of experience.

Pure phenomenology The type of phenomenology proposed by Husserl, the purpose of which was to create a taxonomy of the mind. Husserl believed that before a science of psychology would be possible, we would first need to understand the essences of those mental processes in terms of which we understand and respond to the world.

Savings The difference between the time it originally takes to learn something and the time it takes to relearn it.

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School A group of scientists who share common assumptions, goals, problems, and methods.

Sensation A basic mental experience that is triggered by an environmental stimulus.

Stimulus error Letting past experience influence an introspective report.

Structuralism The school of psychology founded by Titchener, the goal of which was to describe the structure of the mind.

Stumpf, Carl (1848–1936) Psychologist who was primarily interested in musical perception and who insisted that psychology study intact, meaningful mental experiences instead of searching for meaningless mental elements.

Titchener, Edward Bradford (1867–1927) Created the school of structuralism. Unlike Wundt's voluntarism, structuralism was much more in the tradition of empiricism-associationism.

Tridimensional theory of feeling Wundt's contention that feelings vary along three dimensions: pleasantness-unpleasantness, excitement-calm, and strain-relaxation.

Vaihinger, Hans (1852–1933) Contended that because sensations are all that we can be certain of, all conclusions reached about so-called physical reality must be fictitious. Although fictions are false, they are nonetheless essential for societal living.

Völkerpsychologie Wundt's 10-volume work, in which he investigated higher mental processes through historical analysis and naturalistic observation.

Voluntarism The name given to Wundt's school of psychology because of his belief that, through the process of apperception, individuals could direct their attention toward whatever they wished.

Will According to Wundt, that aspect of humans that allows them to direct their attention anywhere they wish. Because of his emphasis on will, Wundt's version of psychology was called voluntarism.

Wundt, Wilhelm Maximilian (1832–1920) The founder of experimental psychology as a separate discipline and of the school of voluntarism.

Würzburg school A group of psychologists under the influence of Oswald Külpe at the University of Würzburg. Among other things, this group found that some thoughts occur without a specific referent (that is, they are imageless), the higher mental processes could be studied experimentally, and problems have motivational properties that persist until the problem is solved.

10

Evolution and Individual Differences

As we saw in Chapter 9, experimental psychology was a product of Germany. Across the Atlantic, the pioneering U.S. spirit was poised to accept a viewpoint that was new and practical. Evolution provided such a view, and the United States embraced it as no other country did. Not even in England, the birthplace of modern evolutionary theory, did it meet with the enthusiasm it received in the United States. The translation of evolutionary theory into psychology created a program that was uniquely American, and it caused the center of psychological research to shift from Europe to the United States, where it has been ever since.

EVOLUTIONARY THEORY BEFORE DARWIN

The idea that both the earth and living organisms change in some systematic way over time goes back at least as far as the ancient Greeks. Such observations, along with the growing tendency toward objectivity, allowed some early Greeks to hold rudimentary theories of evolution. By the 18th century, several prominent individuals were postulating a more detailed theory of evolution, including Charles Darwin's grandfather, Erasmus Darwin (1731–1802), who believed that one species could be gradually transformed into another. What was missing from these early theories was the mechanism by which the transformation took place. The first to postulate such a mechanism was Jean Lamarck.

Jean-Baptiste Lamarck

In his *Philosophie Zoologique* (1809/1914), the French naturalist **Jean-Baptiste Lamarck (1744–1829)** noted that fossils of various species showed that earlier forms were different from current forms; therefore, species changed over time. Lamarck concluded that environmental changes were responsible for structural changes in plants and animals. If, for example, because of a scarcity of prey, members of a species had to run faster to catch what few prey were available, the muscles involved in running would become more fully developed as a result of the frequent exercise they received. If the muscles involved in running were fully developed in an adult of a species, Lamarck believed, the offspring of this adult would be born with highly developed muscles, which also enhanced their chances for survival.

This theory was called the **inheritance of acquired characteristics**. Obviously, those adult members of species who did not adjust adequately to their environment would not survive and therefore would produce no offspring. In this way, according to Lamarck, the characteristics of a species would change as the traits necessary for survival changed, thus, transmuting the species.

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Jean-Baptiste Lamarck

Herbert Spencer

Herbert Spencer (1820–1903) was born in the industrial town of Derby, England, and was tutored first by his father, who was a schoolmaster, and later by his uncle. He never received a formal education. At age 17, Spencer went to work for the railroad and for the next 10 years held jobs ranging from surveyor to engineer. In 1848 he gained employment in London as a journalist—first as a junior editor of *The Economist* and then as a freelance writer. Spencer's interest in psychology and in evolutionary theory came entirely from what he read during this time. One especially influential book was John Stuart Mill's *System of Logic* (1843/1874). Spencer's "education" was also enhanced by a small group of intellectuals he befriended. The group included Thomas Huxley (shortly to become the public defender of Darwin's theory of evolution), George Henry Lewes (a fellow journalist whose broad interests included acting, writing biographies, and science), and Mary Ann Evans (also a fellow journalist, better known as George Eliot). Clearly, Spencer was not inhibited by a lack of formal education:

> From his voracious reading and the exchanges with his group of friends during the early 1850s Spencer acquired a general vision of the world that was to have a more pervasive effect on nineteenth century thinking than that of any other philosopher of his era. (Boakes, 1984, p. 10)

Spencer's View of Evolution. An early follower of Lamarck (and later Darwin), Spencer took the notion of evolution and applied it not only to animals but also to the human mind and human societies. In fact, he applied the notion of evolution to everything. Everything, according to Spencer, begins as an undifferentiated whole. Through evolution, differentiation occurs so that systems become increasingly complex. This notion applies to the human nervous system, which was simple and homogenous eons ago but through evolution has become highly differentiated and complex.

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Courtesy of the National Library of Medicine

Herbert Spencer

The fact that we now have complex nervous systems allows us to make a greater number of associations; the greater the number of associations an organism can make, the more intelligent it is. Our highly complex nervous system allows us to make an accurate neurophysiological (and thus mental) recording of events in our environment, and this ability is conducive to survival. J. P. Guilford (1967)—a student of Titchener's that we will encounter later in this chapter—notes that it was Spencer then that introduces the term *intelligence* as it is used in modern psychology.

In his explanation of how associations are formed, Spencer relied heavily on the principle of contiguity. Environmental events that occur both simultaneously or in close succession are recorded in the brain and give rise to ideas of those events. Through the process of contiguity, our ideas come to map environmental events. However, for Spencer, the principle of contiguity alone was not adequate to explain why some behaviors persist whereas others do not. To explain the differential persistence of various behaviors, Spencer accepted Bain's explanation of voluntary behavior. Spencer said, "On the recurrence of the circumstances, these muscular movements that were followed by success are likely to be repeated; what was at first an accidental combination of motions will now be a combination having considerable probability" (1870, p. 545). Spencer placed Bain's observation within the context of evolutionary theory by asserting that a person persists in behaviors that are conducive to survival (those that cause pleasant feelings) and abstain from those that are not (those that cause painful feelings). Spencer's synthesis of the principle of contiguity and evolutionary theory has been called "evolutionary associationism." The contention that the frequency or probability of some behavior increases if it is followed by a pleasurable event and decreases if it is followed by a painful event came to be known as the **Spencer–Bain principle**. This principle was to become the cornerstone of Thorndike's connectionism (see Chapter 11) and Skinner's operant behavior (see Chapter 13).

The next step that Spencer took tied his theory directly to Lamarck's. Spencer claimed that an offspring inherited the cumulative associations its ancestors had learned. Those associations that preceding generations had found to be conducive to survival were passed on to the next generation, that is, there is an inheritance of acquired associations. Spencer's theory was a blending of empiricism, associationism, and nativism because he believed that the associations gained from experience are passed on to offspring. For Spencer, then, instincts are nothing more than habits that had been conducive to survival for preceding generations. Instincts had been formed in past generations just as habits are formed in an organism's lifetime—through association.

When Darwin's work appeared, Spencer merely shifted his emphasis from acquired characteristics to natural selection. The concept of the **survival of the fittest** (a term Spencer introduced in 1852 that was later adopted by Darwin) applied in either case.

Social Darwinism. There was a basic difference between Spencer and Darwin in how they viewed evolution. To Spencer, evolution meant progress. That is, evolution has a purpose; it is the mechanism by which perfection is approximated. Darwin believed no such thing:

> For Darwin, evolution did not manifest any prestructured, preestablished or

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> predetermined design or order throughout natural history; there is no overall direction in evolution, i.e., no ultimate purpose or final end-goal to organic evolution in general, or human evolution in particular. (Birx, 1998, p. xxii)

On the other hand, for Spencer, the attainment of human perfection was just a matter of time. Spencer went further, saying that evolutionary principles apply to societies as well as individuals. Spencer's application of his notion of the survival of the fittest to society came to be called **social Darwinism**. As Spencer saw it, humans in society, like other animals in their natural environment, struggle for survival, and only the most fit survive. According to Spencer, if the principles of evolution are allowed to operate freely, all living organisms will approximate perfection, including humans. The best policy for a government to follow, then, is a laissez-faire policy that provides for free competition among its citizens. Government programs designed to help the weak and poor would only interfere with evolutionary principles and inhibit a society on its course toward increased perfection.

The following statement demonstrates how far Spencer believed governments should follow a laissez-faire policy: "If [individuals] are sufficiently complete [both physically and mentally] to live, they *do* live, and it is well they should live. If they are not sufficiently complete to live, they die, and it is best they should die" (1864, p. 415). Interestingly, Spencer opposed only government programs to help the weak and poor. He supported private charity because he believed it strengthened the character of the donors (Hofstadter, 1955).

Clearly, Spencer's ideas were compatible with U.S. capitalism and individualism. In the United States, Spencer's ideas were taught in most universities, and his books sold hundreds of thousands of copies. Indeed, when Spencer visited the United States in 1882, he was treated like a hero. As might be expected, social Darwinism was especially appreciated by U.S. industrialists. In a Sunday school address, John D. Rockefeller said,

> The growth of a large business is merely a survival of the fittest.… The American Beauty rose can be produced in the splendor and fragrance which bring cheer to its beholder only by sacrificing the early buds which grow up around it. This is not an evil tendency in business. It is merely the working-out of a law of nature and a law of God. (Hofstadter, 1955, p. 45)

Andrew Carnegie went even further, saying that for him evolutionary theory (social Darwinism) replaced traditional religion:

> I remember that light came as in a flood and all was clear. Not only had I got rid of theology and the supernatural, but I had found the truth of evolution. "All is well since all grows better," became my motto, my true source of comfort. Man was not created with an instinct for his own degradation, but from the lower he had risen to the higher forms. Nor is there any conceivable end to his march to perfection. His face is turned to the light; he stands in the sun and looks upward. (Hofstadter, 1955, p. 45)

It should not be concluded that Darwin was entirely unsympathetic toward applying evolutionary principles to societies in the way Spencer had. In *The Descent of Man* (1874/1998a), Darwin said,

> With savages, the weak in body or mind are soon eliminated; and those that survive commonly exhibit a vigorous state of health. We civilized men, on the other hand, do our utmost to check the process of elimination; we build asylums for the imbecile, the maimed, and the sick; we institute poor-laws; and our medical men exert their utmost skill to save the life of every one to the last moment. There is reason to believe that vaccination has preserved thousands, who from a weak constitution would formerly have succumbed to smallpox. Thus the weak members of civilized societies propagate their kind. No

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> one who has attended to the breeding of domestic animals will doubt that this must be highly injurious to the race of man.… [E]xcepting in the case of man himself, hardly any one is so ignorant as to allow his worst animals to breed. (pp. 138–139)

It was Spencer, however, who featured such thinking and emphasized the belief that societies, like individuals, would approximate perfection if natural forces were allowed to operate freely.

Although we have focused on Spencer as an evolutionary (and social) theorist, that is by no means the limit of his contributions to the history of psychology. He was a popularizer of positive science in the tradition of Comte and of utilitarian ethics in the tradition of Bentham. In addition to the legacy of the Spencer–Bain principle, his 1855 textbook, *Principles of Psychology*, was the most widely read English language work on psychology for decades. William James used it in the first psychology course he taught at Harvard, and honored the work in his own book of the same name (Chapter 11).

CHARLES DARWIN

Charles Darwin (1809–1882) was born in Shrewsbury, England, in the same year that Lamarck published his book describing the inheritance of acquired characteristics. Incidentally, it is one of those interesting quirks of history that Darwin and Abraham Lincoln were born within hours of each other. As previously noted, Darwin's grandfather Erasmus Darwin was a famous physician who dabbled in, among many other things, evolutionary theory. Darwin's father, Robert, was also a prominent physician, and his mother, Susannah Wedgwood, came from a family famous for their manufacture of chinaware. Robert and Susannah had six children, of whom Charles was fifth. His mother died in 1817, when he was eight years old. His care thereafter was primarily the responsibility of two of his older sisters.

After receiving his early education at home, Charles was eventually sent to school, where he did so poorly that his father predicted that some day he would disgrace himself and his family. Outside of school, however, he spent most of his time collecting and classifying plants, shells, and minerals. Academically, matters did not improve much when, at 16 years of age, Darwin entered medical school at the University of Edinburgh. He found the lectures boring and could not stand watching operations performed without benefit of anesthesia. Following his father's advice, Darwin transferred to Cambridge University to train to become an Anglican clergyman. At Cambridge, he drank, sang, and ate (he was a member of the gourmet club) his way to an 1831 graduation with a mediocre academic record. Darwin remembered collecting beetles as the activity that brought him the most pleasure while at Cambridge.

It was Darwin's passion for entomology (the study of insects) that put him into contact with professors of botany and geology at Cambridge, with whom he studied and did field research. For example, immediately upon graduation from Cambridge, Darwin went on a geological expedition to Wales headed by Adam Sedgwick, a Cambridge professor of geology. Although Darwin was certainly interested in the expedition, he also saw it as a way of temporarily escaping the taking of his religious vows. A more permanent escape on the high seas was soon to be available to him. While at Cambridge, Darwin had befriended the botanist John Henslow, and it was Henslow who was first offered the position of naturalist aboard the *Beagle*.

Because of family commitments, Henslow had to decline the offer and suggested that Darwin go in his place. At first, Darwin's father refused his permission because he would need to pay Charles's expenses on the trip and because he felt the journey would interfere with his son's clerical career. After discussing the matter with other members of the family, however, Darwin's father changed his mind and endorsed the adventure.

The Journey of the Beagle

Thus, it was at the instigation of one of his instructors that Darwin signed on as an unpaid naturalist

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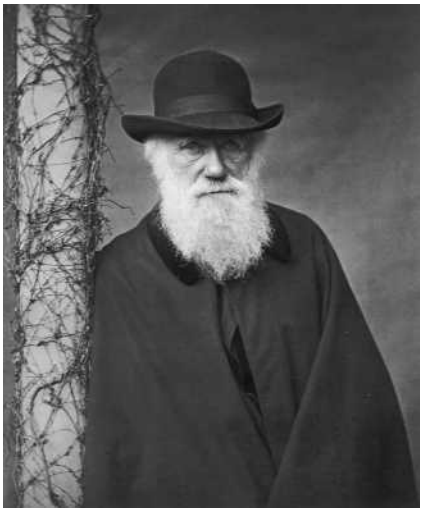

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Charles Darwin

aboard the HMS *Beagle*, which the British government was sending on a multiyear scientific expedition. Because Captain Robert FitzRoy believed in physiognomy (recall Chapter 8), he almost rejected Darwin as the *Beagle*'s naturalist:

> On becoming very intimate with FitzRoy, I heard that I had run a very narrow risk of being rejected on account of the shape of my nose! He was ... convinced that he could judge a man's character by the outline of his features; and doubted whether anyone with my nose could possess sufficient energy and determination for the voyage. But I think he was afterwards well satisfied that my nose had spoken falsely. (F. Darwin, 1892/1958, p. 27)

FitzRoy (1805–1865) was himself an interesting figure. He became a firm believer in the biblical account of creation, but was also a scientist associated with key advances in the field of meteorology. Additionally, he was a noted political figure during England's golden age of exploration, serving for a while as governor of New Zealand.

The journey of the *Beagle* began on December 27, 1831, from Plymouth, England. Darwin was 23 years old at the time. The *Beagle* went first to South America, where Darwin studied marine organisms, fossils, and tribes of Indians. Then, in the fall of 1835, the *Beagle* stopped at the Galapagos Islands, where Darwin studied huge tortoises, lizards, sea lions, and 13 species of finch. Of special interest was his observation that tortoises, plants, insects, and other organisms differed somewhat from island to island, even when the islands were separated by a relatively short distance. The *Beagle* went on to Tahiti, New Zealand, and Australia; and in October 1836, Darwin arrived back in England, where he went to work classifying his enormous specimen collection.

Back in England. Even after Darwin returned to England, his observations remained disjointed; he needed a principle to tie them together. Reading **Thomas Malthus**'s *An Essay on the Principle of Population* (1798/1914) furnished Darwin with that principle. An economist, Malthus (1766–1834) observed that the world's food supply increased arithmetically, whereas the human population tended to increase geometrically. He concluded that food supply and population size were kept in balance by such events as war, starvation, and disease. Darwin embellished Malthus's concept and applied it to animals and plants as well as to humans.

In January 1839, Darwin married his cousin Emma Wedgwood, with whom he eventually had 10 children. It was about the time that he married Emma that Darwin began to have the serious health problems that were to plague him for the next 30 years. At one time or another, he experienced severe gastric pain, heart palpitations, acute anxiety, depression, and a variety of skin disorders. Most scholars agree that Darwin's ailments were psychosomatic: "During the course of his life Darwin consulted most of the leading physicians and surgeons of his day, but none of them ever found anything organically wrong" (Bowlby, 1991, p. 7). In part because of his health problems and in part because he realized that what he was working on was revolutionary (perhaps the two were related), Darwin delayed publication of his theory of evolution for more than 20 years. In fact, there is reason to believe that Darwin's theory would have been

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Thomas Malthus

published only after his death if it had not been for a forceful demonstration that the time was right for such a theory.

In June 1858, Darwin received a letter from **Alfred Russell Wallace (1823–1913)** describing a theory of evolution almost identical to his own. Wallace, too, had been influenced by Malthus's essay, as well as by his own observations in the Amazon and in the Malay Archipelago. Charles Lyell, the eminent evolutionary geologist, reviewed both Wallace's and Darwin's ideas and suggested that both Wallace's paper and one hastily prepared by Darwin be read at the Linnaean Society on the same day and with both authors absent. This was done, and neither paper roused much interest (Boakes, 1984). Darwin's epoch-making book *On the Origin of Species by Means of Natural Selection* (1859) was published two months later. By then there was so much interest in evolutionary theory that all 1,500 copies of the book sold on the first day it was available.

Following the publication of *Origin* were several public debates over the validity of Darwin's theory, but Darwin didn't participate. Instead, it was his friend Thomas Henry Huxley (1825–1895) who effectively defended the theory. For this he was dubbed "Darwin's bulldog." The colorful Huxley (see Desmond, 1997) was the patriarch of what would become one of England's most famous academic families. His grandsons were Aldous Huxley (who wrote *Brave New World*) and Nobel prize winner Sir Andrew Huxley—who received the award for his contributions to understanding how electrical action potentials work in the nervous system (recall Du-Bois Reymond from Chapter 8).

One public debate pitted Huxley against the Bishop of Oxford, Samuel Wilberforce. At one point their meeting was interrupted by former Captain FitzRoy who thumped his Bible and spoke out against Darwin. A few years later FitzRoy committed suicide, perhaps because he felt that he was at least partially responsible for Darwin's theory of evolution (Gould, 1976; White & Gribbin, 1995).

Because of the abundance of data Darwin amassed and the thoroughness of his work, we attribute the theory to him and not to Wallace, but what follows may someday be referred to as the Darwin-Wallace theory of evolution as testimony to the similarity of their ideas. Darwin died on April 19, 1882, at the age of 73. He was buried in Westminster Abbey, near the grave of Isaac Newton.

Incidentally, Wallace was one of the most outspoken opponents of social Darwinism. Rather than accepting a laissez-faire philosophy concerning human competition, Wallace believed that humans could, and should, guide their own evolution. For Wallace, this meant creating government programs that help those individuals less equipped to compete in a complex society. Far from being a historical footnote, Wallace was a leading naturalist of the day, and the person Darwin most cited. His work can also be connected to Mill, to phrenology, and to considerations of individual differences that we will consider later in this chapter.

Darwin's Theory of Evolution

The reproductive capacity of all living organisms allows for many more offspring than can survive in a given environment; therefore, there is a **struggle for survival**. Among the offspring of any species, there are vast individual differences, some of which are more conducive to survival than others. This results in the survival of the fittest (a term Darwin borrowed from Spencer). For example, if there is a shortage of food in the environment of giraffes, only those giraffes with necks long enough to reach the few remaining leaves on tall trees will survive and reproduce. In this way, as long as food remains scarce, giraffes with shorter necks will tend to become extinct. Thus, a **natural selection** occurs among the offspring of a species. This natural selection of adaptive characteristics from the individual differences occurring among offspring accounts for the slow transmutation of a species over the eons. Evolution, then, results from the natural selection of those accidental variations among members of a species that prove to have survival value.

Darwin defined **fitness** as an organism's ability to survive and reproduce. Fitness, then, is determined by an organism's features and its environment. Features that allow adequate adjustment to an organism's environment are called adaptive. Those organisms possessing **adaptive features** are fit; those that do not are not. Notice that nothing is said about strength, aggression, and competitiveness. None of these features are *necessarily* conducive to fitness. Adaptive features are those features that are conducive to survival in a given environment, *whatever* those features may be. Also notice that Darwin said nothing about progress or perfection. Unlike Spencer, Darwin believed that evolution just happens; there is no direction or purpose involved. The direction that evolution takes is completely determined by the features possessed by members of various species of organisms and the environments in which those organisms exist. As environments change, what features are adaptive also change, and on it goes forever.

Another point worth noting is that Darwin knew nothing about genetics. He understood that traits from parents were passed to the offspring, but not *how*. Although the discovery had been made (and published in 1865) by the monk **Gregor Mendel (1822–1884)** based on work with breeding almost 30,000 pea plants, his findings were not connected to evolution until around 1900. Ironically, Darwin also bred plants and likely had similar data.

Evolution and the Earth's Age. One of the earliest conflicts that Darwin had with the church was over the age of the earth. As Darwin saw it, the process of evolution occurred over millions of years. Within the church at the time, it was generally believed that the earth was not nearly as old as was required by Darwin's theory and, therefore, the theory must be false. For their arguments against Darwin, church officials drew upon estimates of the earth's age based on biblical study. For example, Archbishop James Ussher (1581–1656), Vice Chancellor of Trinity College in Dublin, after carefully studying various biblical events, concluded that the creation had occurred in 4004 B.C. John Lightfoot (1602–1675), Vice Chancellor of Cambridge University, was even more specific. After exhaustive study of the scriptures, he concluded that the creation occurred at precisely 9 a.m. on Sunday, October 23, 4004 B.C. (White & Gribbin, 1995, p. 83). Even in Darwin's time, there was considerable geological and fossil evidence indicating that the earth was significantly older than was suggested by church authorities. Currently, many scientists estimate the earth to be approximately 4.5 billion years old, and this, of course, is more than what is required by Darwin's theory. However, the debate between evolutionary theory and creationism continues (see, for example, Larson, 2001).

Human Evolution. In *On the Origin of Species*, Darwin said very little about humans, but later, in *The Descent of Man* (1871, revised in 1874/1998a), he made his case that humans are also the product of evolution. Both humans and the great apes, he said, descended from a common, distant primate ancestor.

Of Darwin's books, the one most directly related to psychology is *The Expression of the Emotions in Man and Animals* (1872/1998b), in which he argued that human emotions are remnants of animal emotions that had once been necessary for survival. In the distant past, only those organisms capable of such things as biting and clawing survived and reproduced. Somewhat later, perhaps, simply baring of teeth or snarling were enough to discourage an aggressor and therefore facilitated survival. Although no longer as functional in modern society, the emotions that were originally associated with attack or defense are still part of our biological makeup, as can be seen in human reactions under extreme conditions. Darwin also noted that the expression of human emotions is culturally universal. By observing the facial characteristics of a person anywhere on earth, one could determine if that person were experiencing joy, grief, anger, sadness, or some other emotion. For an excellent summary of Darwin's theory of emotions and a discussion of its current relevance, see Ekman (1998).

Even if Darwin had decided to let Wallace take full credit for the theory of evolution, he would surely still have a place in our history given his contributions to the study animal and human behavior. Darwin's direct comparison of humans with other animals in *The Expression of the Emotions*, along with his forceful assertion that humans differ from other animals only in degree, launched modern comparative and animal psychology. It became clear that much could be learned about humans by studying nonhuman animals.

Darwin also influenced subsequent psychology when he carefully observed the development of his first son, William (born 1839). He noted when various reflexes and motor abilities first appeared, as well as various learning abilities. Although he delayed publication of his observations until William was 37, Darwin's report (1877) was among the first examples of what was later called developmental psychology.

Darwin's Influence

To say the least, Darwin's theory was revolutionary. Its impact has been compared to that of the theories of Copernicus and Newton. He changed the traditional view of human nature and with it changed the history of philosophy and psychology. Many of the topics dismissed by Titchener because they did not represent pure experimental psychology were encouraged by Darwin's theory. Popular topics in contemporary psychology clearly reveal a strong Darwinian influence: developmental psychology, animal psychology, comparative psychology, psychobiology, learning, tests and measurements, emotions, behavioral genetics, abnormal psychology, and a variety of other topics under the heading of applied psychology. In general, Darwin stimulated interest in the study of individual differences and showed that studying behavior is at least as important as studying the mind. As we will see, Darwin's theory of evolution played a significant role in the development of the schools of functionalism (Chapter 11) and behaviorism (Chapter 12).

Darwin's influence, however, was not entirely positive. He entertained a number of beliefs now considered highly questionable or mistaken, such as the following:

- Contemporary primitive people are the link between primates and modern humans (that is, Europeans) and are therefore, inferior.
- Women are intellectually inferior to men. Alland (1985) says, "Darwin at his worst is Darwin on women" (p. 24). For examples of Darwin's beliefs concerning the intellectual inferiority of women, see Darwin (1874/1998a, pp. 576–577, 584).
- Long practiced habits become heritable instincts; in other words, in explaining cultural differences among humans, Darwin accepted Lamarckian theory.

In addition to its general impact on psychology, evolutionary theory is currently having a more direct impact. In 1975 Edward Wilson published *Sociobiology: The New Synthesis*, which attempts to explain the social behavior of organisms, including that of humans, in terms of evolutionary theory. By modifying Darwin's definition of fitness from the survival and reproductive success of the individual (Darwin's definition) to the perpetuation of one's genes, **sociobiology** can account for a wide array of human social behaviors. That is, according to sociobiologists, fitness is determined by how successful one is at perpetuating one's *genes* but not necessarily how successful one is at producing offspring. By emphasizing the importance

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of perpetuating one's genes, the sociobiologists place great emphasis on kin, or genetic, relationships. Because one's kin carries one's genes, helping them survive and reproduce becomes an effective way of perpetuating one's genes. Armed with this conception of **inclusive fitness**, sociobiologists attempt to explain such things as love, altruism, warfare, religion, morality, mating systems, mate-selection strategies, child-rearing strategies, xenophobia, aggressive behavior, nepotism, and indoctrinability. What Wilson called sociobiology is now called **evolutionary psychology** and is extremely popular in contemporary psychology. We will say more about evolutionary psychology in Chapter 18.

As we will see in the remainder of this chapter, Darwin's ideas ultimately gave birth to a uniquely American type of psychology—a psychology that emphasized individual differences and their measurement, the adaptive value of thoughts and behavior, and the study of animal behavior. Before discussing this psychology, however, we must first review the works of Darwin's cousin.

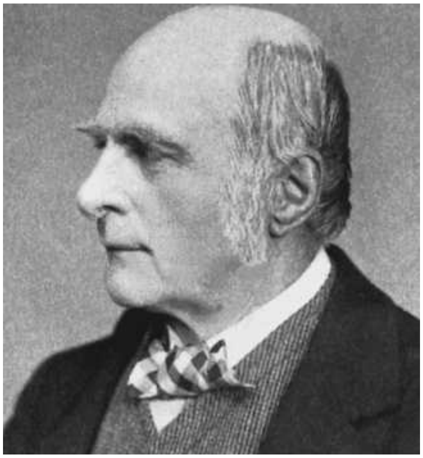
SIR FRANCIS GALTON

Erasmus Darwin, the physician, philosopher, poet, and early evolutionary theorist, was the grandfather of both Charles Darwin and **Francis Galton (1822–1911)**. Darwin's cousin Galton was born near Birmingham, England, the youngest of seven children. His father was a wealthy banker, and his mother was a half-sister of Charles Darwin's father. Receiving his early education at home, Galton could read and write before age 3. By age 5, he could grasp any book written in English, and by age 7, he was reading Shakespeare for pleasure.

Things changed when Galton was sent to a boarding school, where his experiences included being flogged, scarlet fever, hell-raising, enduring sermons from the teachers, and fighting with his fellow students. At age 16, he was sent to Birmingham General Hospital to study medicine. He later transferred to King's College in London, then moved to Cambridge University, where he obtained his degree in 1843. Galton planned to return to King's College to complete a medical degree; but when his father died, he decided not to, so his formal education ended.

This era was a highpoint of the British Empire, with exploration and trade being conducted all across the globe. Consider the famed adventurer Sir Richard Francis Burton (1821–1890). After service in India he clandestinely visited Mecca in 1853, then famously started the search for the source of the Nile in central Africa soon thereafter. Such explorations often included proto-psychological descriptions of new peoples and customs. For example, Burton wrote extensively about sexual practices different from those in England.

Because Galton was independently wealthy, he could work on what he wanted, when he wanted. Reveling in the spirit of the times, after graduation he traveled in Egypt, the Sudan, and the Middle East. Then he came home and socialized with his rich friends for a few years—riding, shooting, ballooning, and experimenting with electricity. After consulting with a phrenologist who recommended an active life, Galton decided to join the Royal Geographical Society on a trip to southwest Africa. The trip lasted two years, and for Galton's creation of a map of previously unexplored territories in Africa (now called Namibia), the Royal Geographical Society honored



Francis Galton

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him in 1853 with its highest medal. Galton was 32 at the time. We can see in Galton's map-making ability a passion that he had all his adult life: the passion to measure things.

In 1853 Galton published his first book, *Narrative of an Explorer in Tropical South Africa*. He became a recognized expert on travel in the wild, and the British government commissioned him to teach camping procedures to soldiers. In 1855 he published his second book, *The Art of Travel*, which included information on how to deal with wild animals and savages. For his inventiveness, Galton was elected president of the Royal Geographical Society in 1856.

To further illustrate Galton's passion for measurement, here are a few of his other endeavors:

- In his effort to measure and predict the weather, he invented the weather map and was the first to use the terms *highs*, *lows*, and *fronts*.
- He was the first to suggest that fingerprints could be used for personal identification—a procedure later adopted by Scotland Yard.
- Initially intended as another tool for criminologists, Galton studied composite portraiture or the creation of new faces based on combining multiple photographs. He discovered that the more images used, the more attractive the composite face.
- He tried to determine which country had the most beautiful women.
- He measured the degree of boredom at scientific lectures.
- He attempted to determine the effectiveness of prayer (he found it ineffective).

One can imagine Galton's delight when he became aware of his cousin's evolutionary theory with its emphasis on individual differences. Galton believed that if there were important individual differences among people, clearly they should be measured and cataloged. This became Galton's mission in life.

The Measurement of Intelligence

Galton assumed that intelligence is a matter of sensory acuity because humans can know the world only through the senses. Thus, the more acute the senses, the more intelligent a person was presumed to be. Furthermore, because sensory acuity is mainly a function of natural endowment, intelligence is inherited. And if intelligence is inherited, as Galton assumed, one would expect to see extremes in intelligence run in families. Assuming that high reputation or eminence is an accurate indicator of high intellectual ability, Galton set out to measure the frequency of eminence among the offspring of illustrious parents as compared to the frequency of eminence among the offspring of the general population. For comparison with the general population, Galton studied the offspring of judges, statesmen, commanders, literary men, scientists, poets, musicians, painters, and wrestlers. The results, published in *Hereditary Genius: An Inquiry into Its Laws and Consequences* (1869), were clear: the offspring of illustrious individuals were far more likely to be illustrious than were the offspring of nonillustrious individuals. Galton also observed, however, that zeal and vigor must be coupled with inherited capacity before eminence can be attained.

Eugenics. Galton's conclusion raised a fascinating possibility: *selective breeding*. If intelligence is inherited, could not the general intelligence of a people be improved by encouraging the mating of bright people and discouraging the mating of people who were less bright? Galton's answer was yes. He called the improvement of living organisms through selective breeding **eugenics** and advocated its practice:

> I propose to show in this book that a man's natural abilities are derived by inheritance, under exactly the same limitations as are the form and physical features of the whole organic world. Consequently, as it is easy, notwithstanding those limitations, to obtain by careful selection a permanent breed of dogs or horses gifted with peculiar powers of running, or of doing anything else, so it would be quite practicable to produce a highly-gifted race of men by judicious marriages during several

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> consecutive generations. I shall show that social agencies of an ordinary character, whose influences are little suspected, are at this moment working towards the degradation of human nature, and that others are working towards its improvement. I conclude that each generation has enormous power over the natural gifts of those that follow, and maintain that it is a duty we owe to humanity to investigate the range of that power, and to exercise it in a way that, without being unwise towards ourselves, shall be most advantageous to future inhabitants of the earth. (Galton, 1869, p. 45)

In 1865 Galton proposed that couples be scientifically paired and that the government pay those possessing desirable characteristics to marry. The government was also to take care of the educational expenses of any offspring. After reading *Hereditary Genius*, Darwin wrote to his cousin: "You have made a convert of an opponent in one sense, for I have always maintained that excepting fools, men did not differ much in intellect only in zeal and hard work" (Pearson, 1914, p. 6). Darwin gave credit to Galton for calling to his attention the fact that allowing weak members of a society to breed weakens the human stock. Thus, as we have noted, Darwin was not entirely adverse to what was called social Darwinism nor, as we have seen, was he entirely opposed to the idea of eugenics.

The very mention of eugenics is often considered distasteful given its association with Nazi atrocities and various modern-day ethnic "cleansings." Nevertheless, as Galton observed animals had long been selectively bred, and almost every culture engaged in some sort of eugenics. Infanticide was practiced by the ancient Greeks, and still exists in many countries today. Historically, marriages were usually arranged in most cultures, and implicitly many social conventions facilitate the same practice worldwide even now (for example, the cheerleader who dates the quarterback). As we will see later in this chapter, eugenics was openly embraced by many early American psychologists.

The Nature—Nurture Controversy

Galton's extreme nativism did not go unchallenged. Alphonse de Candolle (1806–1893), for example, wrote a book stressing the importance of environment in producing scientists. Candolle suggested that climate, religious tolerance, democratic government, and a thriving economy were at least as important as inherited capacity in producing scientists.

Such criticism prompted Galton's next book, *English Men of Science: Their Nature and Nurture* (1874). To gather information for this book, Galton sent a questionnaire to 200 of his fellow scientists at the Royal Society. This was the first use of the questionnaire in psychology. The participants were asked many factual questions, ranging from their political and religious backgrounds to their hat sizes. In addition, they were asked to explain why they had become interested in science in general as well as in their particular branches of science. Finally, the scientists were asked whether they thought that their interest in science was innate.

Although the questionnaire was very long, most of the scientists finished and returned it, and most believed that their interest in science was inherited. Galton noticed, however, that a disproportionate number of the scientists were Scottish and that these scientists praised the broad and liberal Scottish educational system. Conversely, the English scientists had very unkind things to say about the English educational system. On the basis of these findings, Galton urged that English schools be reformed to make them more like Scottish schools; here Galton was acknowledging the importance of the environment. His revised position was that the *potential* for high intelligence was inherited but that it must be nurtured by a proper environment. Galton (1874) clearly stated the **nature—nurture controversy**, which is still the focus of much attention in modern psychology:

> The phrase "nature and nurture" is a convenient jingle of words, for it separates under two distinct heads the innumerable elements of which personality is composed. Nature is all that a man brings with

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> himself into the world; nurture is every influence that affects him after his birth. The distinction is clear: the one produces the infant such as it actually is, including its latent faculties of growth and mind; the other affords the environment amid which the growth takes place, by which natural tendencies may be strengthened or thwarted, or wholly new ones implanted. (p. 12)

In his next book, *Inquiries into Human Faculty and Its Development* (1883), Galton further supported his basic nativistic position by studying twins. He found monozygotic (one-egged) twins to be very similar to each other even when they were reared apart, and he found dizygotic (two-egged) twins to be dissimilar even when they were reared together. Following Galton's lead, it became very popular to study twins to determine the relative influence of nature and nurture on various attributes, such as intelligence. Twin research remains powerful and popular today.

Words and Images

In *Inquiries*, Galton devised psychology's first word-association test. He wrote 75 words, each on a separate piece of paper. Then he glanced at each word and noted his response to it on another piece of paper. He went through the 75 words on four different occasions, randomizing the words each time. Three things struck Galton about this study. First, responses to stimulus words tended to be constant; he very often gave the same response to a word all four times he experienced it. Second, his responses were often drawn from his childhood experience. Third, he felt that such a procedure revealed aspects of the mind never revealed before:

> Perhaps the strongest of the impressions left by these experiments regards the multifariousness of the work done by the mind in a state of half-consciousness, and the valid reason they afford for believing in the existence of still deeper strata of mental operations, sunk wholly below the level of consciousness, which may account for such mental phenomena as cannot otherwise be explained. (Galton, 1883, p. 145)

Both Wundt and Jung used Galton's word association methods. Whether Galton directly influenced Freud is not known, but Galton's work with word association anticipated two aspects of psychoanalysis: the use of free association and the recognition of unconscious motivation. As Crovitz (1970) notes, both his work with words and images also laid a foundation for many subsequent studies of memory and cognition.

Mental Imagery. Galton was also among the first, if not the first, to study imagery. In *Inquiries* he reported the results of asking people to imagine the scene as they had sat down to breakfast. He found that the ability to imagine was essentially normally distributed, with some individuals almost totally incapable of imagery and others having the ability to imagine the breakfast scene in great detail. Galton was amazed to find that many of his scientist friends had virtually no ability to form images. If sensations and their remnants (images) were the stuff of all thinking, as the empiricists had assumed, why was it that many scientists seemed unable to form and use images? Galton also found, not so surprisingly, that whatever a person's imagery ability was, he or she assumed that everyone else had the same ability.

Anthropometry

Galton's desire to measure individual differences among humans inspired him to create what he called an "anthropometric laboratory" at London's International Health Exhibition in 1884. Here, in about one year, Galton measured 9,337 humans in just about every way he could imagine. For example, he measured head size, arm span, standing height, sitting height, length of the middle finger, weight, strength of hand squeeze (measured by a dynamometer), breathing capacity, visual acuity, auditory acuity, reaction time to visual and auditory stimuli, the highest detectable auditory tone, and

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speed of blow (the time it takes for a person to punch a pad). Some of these measures were included because Galton believed sensory acuity to be related to intelligence, and for that reason, Galton's anthropometric laboratory can be viewed as an effort to measure intelligence, or even the beginning of the mental testing movement in psychology.

In 1888 Galton set up a similar laboratory in the science galleries of the South Kensington Museum, and it operated for several years. A handout described the purpose of the laboratory to potential participants:

1. For the use of those who desire to be accurately measured in many ways, either to obtain timely warning of remediable faults in development, or to learn their powers.
2. For keeping a methodological register of the principal measurements of each person, of which he may at any future time obtain a copy under reasonable restrictions. His initials and date of birth will be entered in the register, but not his name. The names are indexed in a separate book.
3. For supplying information on the methods, practice, and uses of human measurement.
4. For anthropometric experiment and research, and for obtaining data for statistical discussion. (Pearson, 1924, p. 358)

For a small fee (threepence), a person would be measured in all ways described above; and for a smaller fee (twopence), a person could be measured again at another time. Each participant was given a copy of his or her results, and Galton kept a copy for his files. Among the many things that Galton was interested in examining were test-retest relationships, gender differences on various measurements, intercorrelations among various measurements, relationships of various measurements to socioeconomic status, and family resemblances among various measurements. Because Galton's incredible amount of data existed long before there were computers or even calculators, much of it went unanalyzed at the time. Since then, however, other researchers have analyzed portions of the previously unanalyzed material. For example, Johnson et al. (1985) reported the results of Galton's own analyses, the results of analyses of Galton's data done by researchers after him, and their own considerations of Galton's data.

The Concept of Correlation

The last of Galton's many contributions to psychology we will consider is his notion of correlation, which has become one of psychology's most widely used statistical methods. In 1888 Galton published an article titled "Co-Relations and Their Measurement, Chiefly from Anthropometric Data," and in 1889 he published a book titled *Natural Inheritance*. Both works describe the concepts of correlation and regression. Galton (1888) defined **correlation**, or co-relation, as follows:

> Two variable organs are said to be co-related when the variation on one is accompanied on the average by more or less variation of the other, and in the same direction. Thus the length of the arm is said to be co-related with that of the leg, because a person with a long arm has usually a long leg, and conversely. (p. 135)

In a definition of correlation, the word *tend* is very important. Even in the above quotation, Galton said that those with long arms *usually* have long legs. After planting peas of varying sizes and measuring the size of their offspring, Galton observed that very large peas tended to have offspring not quite as large as they were and that very small peas tended to have offspring not quite as small as themselves. He called this phenomenon **regression toward the mean**, something he also found when he correlated heights of children with heights of their parents. In fact, Galton found regression whenever he correlated inherited characteristics. Earlier, Galton had observed that eminent individuals only *tended* to have eminent offspring.

By visually displaying his correlational data in the form of scatterplots, Galton found that he could

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visually determine the strength of a relationship. It was **Karl Pearson (1857–1936)** who devised a formula that produced a mathematical expression of the strength of a relationship. Pearson's formula produces the now familiar **coefficient of correlation (r)**.

Pearson was Galton's first biographer, an advocate of eugenics, and the father of statistics. As Galton's "heir," he was the first to hold the Galton Chair of Eugenics at the University of London. Much of his statistical work concerned evolution in one way or another, as did that of the man who replaced him when he retired—Sir Ronald Fisher (1890–1962). The ***F*** you solve for when doing analysis of variance, is for its inventor, ***F***isher. Perhaps surprisingly then, the content of your statistics class is another legacy of Darwin.

In addition to introducing the concept of correlation, Galton also introduced the *median* as a measure of central tendency. He found the *mean* to be overly influenced by extreme scores in a distribution and preferred to use the middle-most score (the median) in a distribution instead.

Galton's Contributions to Psychology. Few individuals in psychology have more firsts attributed to them than does Galton. Galton's firsts include study of the nature–nurture question, the use of questionnaires, the use of a word-association test, twin studies, the study of imagery, intelligence testing, and the development of the correlational technique. Everywhere in his work, we see a concern with individual differences and their measurements, a concern that was a direct reflection of the influence of Darwin's theory of evolution.

The approach of Wundt and Titchener can be described as *nomothetic*, that is, as looking for the generalized and common elements of mind. In contrast, Galton's work is seen as *idiographic*, or looking for individual differences in human nature. **James McKeen Cattell (1860–1944)** studied with Wundt and Galton, reflecting both approaches when he returned to the United States. But of the two, he had been much more influenced by Galton.

James McKeen Cattell: "A Galtonian in America"

Cattell, born in Easton, Pennsylvania, was the son of a Presbyterian clergyman who was also a professor of Latin and Greek at Lafayette College and later its president. Cattell entered Lafayette College before his 16th birthday and stood first in his class without much effort. Among his favorite subjects were mathematics and physics. After graduation from Lafayette in 1880, he traveled to Germany to study with Lotze (Chapter 6). Cattell was very impressed by Lotze, and it came as quite a blow when Lotze died a year after Cattell's arrival.

The following year, Cattell returned home and wrote a paper on philosophy that won him a fellowship at Johns Hopkins University. While at Johns Hopkins (1882–1883), he did research in G. Stanley Hall's new psychology laboratory (see Chapter 11) and decided to become a psychologist. In 1883 Cattell returned to Germany, this time to study with Wundt. Cattell was not only Wundt's first experimental assistant but was also the first student from the United States to earn a doctorate under Wundt's supervision. Cattell received his degree in 1886. While with Wundt, Cattell and a fellow student did numerous reaction-time studies. Among other things, Cattell noticed that his own reaction times differed systematically from those of his fellow researcher and proposed to Wundt that individual differences in reaction time be explored. The proposal was rejected because Wundt was more interested in the nature of the mind in general than with individual differences.

After attaining his doctorate, Cattell returned to the United States, where he taught at Bryn Mawr College and the University of Pennsylvania. About this time, Cattell became aware of Galton's anthropometric laboratory in London and began a correspondence with Galton, mainly concerning the measurement of reaction time. Soon Cattell applied for and received a two-year research fellowship at Cambridge University, where he worked with Galton. In Galton, Cattell finally found someone who shared his intense interest in individual differences. Galton confirmed Cattell's conviction that individual differences were important and that they could be objectively measured. Under Galton's influence, Cattell came to believe that intelligence was related to sensory acuity and was therefore largely inherited:

> As a self-proclaimed disciple of Francis Galton, Cattell's interest in eugenics is clear…. He proposed that incentives be given "the best elements of all the people" to intermarry and have large families [Cattell and his wife had seven children] and in fact offered each of his children $1,000 if they would marry the child of a college professor. (Sokal, 1971, p. 630)

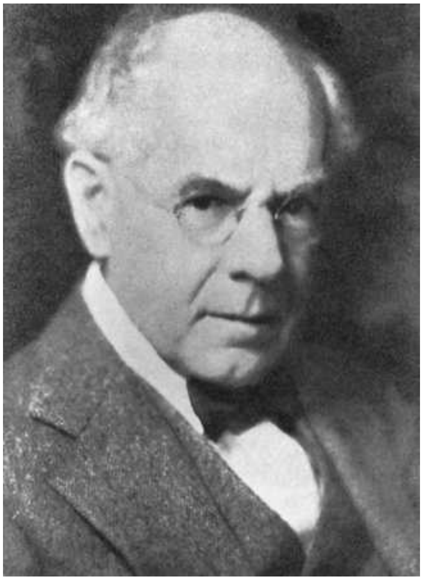
On his return to the United States in 1888, Cattell was first affiliated with the University of Pennsylvania, where in 1889 he founded the first psychology laboratory designed for undergraduate students. It was also at the University of Pennsylvania that Cattell administered Galtonian-type measures to his students. In 1890 Cattell published his techniques and results in an article that used the term *mental test* for the first time:

> Psychology cannot attain the certainty and exactness of the physical sciences, unless it rests on a foundation of experiment and measurement. A step in this direction could be made by applying a series of mental tests and measurements to a large number of individuals. The results would be of considerable scientific value in discovering the constancy of mental processes, their interdependence, and their variation under different circumstances. (p. 373)

It was also in this article that Cattell described 10 mental tests that he believed could be administered to the general public and a total of 50 tests that he believed should be administered to university students. The 10 mental tests were mainly Galtonian, but Cattell also added a few measurements he learned in Wundt's laboratory. Among the 10 tests were hand strength, two-point threshold, amount of pressure required to cause pain, ability to discriminate between weights, reaction time, accuracy of bisecting a 50-centimeter line, accuracy in judging a 10-second interval, and ability to remember a series of letters. The more comprehensive series of 50 tests was essentially more of the same; the vast majority of them measured some form of sensory acuity or reaction time.

In 1891 Cattell moved to Columbia University, where he began administering his tests to entering freshmen. Implicit in Cattell's testing program was the assumption that if a number of his tests were measuring the same thing (intelligence), performance on those tests should be highly correlated. Also implicit was the assumption that if tests were measuring intelligence, they should correlate highly with academic success in college. That is, for a test of intelligence to be valid, it must make differential predictions about how individuals will perform on tasks requiring intelligence.

In 1901 Clark Wissler, one of Cattell's graduate students, tested Cattell's assumptions. Armed with Pearson's newly perfected correlation coefficient, Wissler measured the relationships among Cattell's tests and between performance on various tests and



James McKeen Cattell

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academic performance. Wissler's results were disastrous for Cattell's testing program. He found that intercorrelations among the tests were very low and that the correlation between various tests and success in college was nearly zero (Guilford, 1967). Thus, the tests were not measuring the same thing because if they were, they would be highly correlated; and they were not valid because if they were, scores would correlate highly with academic achievement.

With such unambiguous, negative findings, the interest in mental testing quickly faded. Wissler switched his field to anthropology and became an outspoken environmentalist. Cattell turned to other aspects of applied psychology, becoming a key figure in the school of functionalism that we will consider in the next chapter. As for the moratorium on mental testing, it was not to last long.

INDIVIDUAL DIFFERENCES IN INTELLIGENCE

Alfred Binet

In France, a different approach to measuring intelligence was being tried, one that involved *directly* measuring the complex mental operations thought to be involved. **Alfred Binet (1857–1911)** championed this method of testing. Born in Nice, France, Binet's father was a physician, as were both of his grandfathers. Binet's parents separated when he was young, and being an only child, he was reared mainly by his mother, a successful artist. Although he initially followed the family tradition by studying medicine, Binet terminated his medical studies and turned to psychology instead. Being independently wealthy allowed Binet to take the time to educate himself, and he read the works of Darwin, Galton, and the British empiricists (especially John Stuart Mill), among others.

Binet began his career in psychology by working with Jean-Martin Charcot (1825–1893), the world famous psychiatrist, at La Salpetriere. Like Charcot, Binet conducted research on hypnotism, and he claimed that in one study he had been able to manipulate the symptoms and sensations of a hypnotized subject by moving a magnet to various places around the subject's body. He also claimed that application of the magnet could convert fear of an object, such as a snake, into affection. Binet thought that such findings would have important implications for the practice of medicine in general and for psychiatry in particular, but other researchers could not reproduce Binet's findings and concluded that his results were due to poor experimental control. For example, it was found that Binet's subjects always knew what was expected of them and acted accordingly. When subjects were unaware of the researcher's expectations, they did not exhibit the phenomena Binet had observed (recall Clever Hans).

Binet finally admitted that his results had been due to suggestion and not to the magnet's power, and he resigned his position at La Salpetriere in 1890. The humiliation resulting from his public admission of shoddy methods haunted Binet all his life. His statement "Tell me what you are looking for, and I will tell you what you will find" (Wolf, 1973) was directed at metaphysicians, but Binet knew from personal experience that it could apply to researchers as well.

Alfred Binet

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Fortunately, Binet's second career in psychology was more successful. Without a professional position, Binet directed his attention to the study of the intellectual growth of his two daughters (Alice and Madeleine), who were 2 1/2 and 4 1/2 years old at the time. The tests he created to investigate his children's mental operations were very similar to those Jean Piaget later devised. He asked, for example, which of two piles contained more objects and found that the answer was not determined by the number of objects in the piles but by the amount of space the piles took up on the table. Binet also investigated how well his daughters could remember objects that he first showed them and then removed from sight. Binet also employed a number of tests used by Galton and Cattell to measure visual acuity and reaction time. In 1890 he published three papers describing his research on his daughters, and in 1903 he published *The Experimental Study of Intelligence*, which summarized his longitudinal study of the intellectual growth of his children.

In 1891 Binet joined the laboratory for physiological psychology at the Sorbonne, where he performed research in such areas as memory, the nature of childhood fears, the reliability of eyewitness testimony, creativity, imageless thought, psychophysics, abnormal psychology, craniometry, and graphology. During his years at the Sorbonne, Binet also investigated individual differences in the perception of inkblots—before the famous work of Rorschach. In her outstanding biography of Binet, Theta Wolf (1973) said that Binet was the father of experimental psychology in France and argues that he had more of an enduring impact on U.S. psychology than Wundt did.

Individual Psychology. Like Galton and Cattell, rather than being interested in what people have in common, Binet was primarily interested in what made them different. In 1896 he and his assistant Victor Henri (1872–1940) wrote an article titled "Individual Psychology," which proposed a list of variables on which individuals differ, especially intellectually. What they sought was a way of determining the extent to which each variable exists in a given individual. With the variables isolated and a way of measuring them available, they hoped that it would be possible to "evaluate" any individual in a relatively short period of time.

Nevertheless, the work of Galton and Cattell was rejected because it placed too much emphasis on sensory processes and not enough on higher mental processes. In other words, Binet and Henri proposed to study cognitive abilities *directly* instead of indirectly via sensory acuity. Another reason the work of Galton and Cattell was rejected is that it minimized important differences between a child's mind and an adult's. According to Binet and Henri, the important variables on which humans differ are complex, higher-order processes that vary according to age. The list of such variables proposed in 1896 included memory, imagery, imagination, attention, comprehension, suggestibility, aesthetic judgment, moral judgment, force of will, and judgment of visual space.

Unfortunately, Binet and Henri's goal of accessing a person's higher mental processes took many hours, and interpreting the results then required many more hours of subjective, clinical judgment. Even more devastating, however, was the study on their tests performed by Stella Sharp, a graduate student at Cornell University. Sharp (1899) found very low intercorrelations among the Binet–Henri tests and concluded (as Wissler had concluded about Cattell's tests) that they could not be measuring the same attribute (presumably intelligence). Such findings, along with their own disappointing results, caused Binet and Henri to abandon their "individual psychology" project. The experience gained, however, would serve Binet well on his next project.

Assessing Intellectual Deficiency. In 1899, **Theodore Simon (1873–1961)**, who worked as an intern at a large institution for children with mental retardation, asked Binet to supervise his doctoral research. Binet agreed and viewed this as an opportunity to have access to a large subject pool. Also in 1899, Binet joined the Free Society for the Psychological Study of the Child, an organization that sought scientifically valid information

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about children, especially about their educational problems. Binet soon became leader of the society. In 1903 Binet and Simon were appointed to the group that the French government commissioned to study the problems of children with retardation in the French schools. It was immediately clear that if children with retardation were to receive special education, it was necessary to have an adequate method of distinguishing them from normal children. At the time, variations of Galton's tests were being used to detect mental retardation, and Binet noted that because of these tests, children who were blind or deaf were erroneously being classified as having mental deficiencies.

In 1904 Binet and Simon set out to create tests that would differentiate between intellectually normal and intellectually subnormal children. Their first step was to isolate one group of children clearly diagnosed as normal and another group diagnosed as subnormal. The second step was to test both groups in a number of different ways, hoping to discover measurements that would clearly distinguish members of one group from the other.

The 1905 Binet–Simon Scale of Intelligence. Binet and Simon offered the **Binet–Simon scale of intelligence** as a valid way of distinguishing between normal children and children with mental deficiencies—a way that was to replace the less reliable physical, social, and educational signs being used at the time to identify children with mental retardation. The 1905 scale consisted of 30 tests ranging in difficulty from simple eye movements to abstract definitions. Three of the tests measured motor development, and the other 27 were designed to measure cognitive abilities. The tests were arranged in order of difficulty so that the more tests a child passed, the more fully developed his or her intelligence was assumed to be. The scale was given to normal children and to children thought to have retardation, all of them between the ages of 2 and 12.

Binet and Simon found that almost all normal children aged 2 years or older could easily pass tests 1 through 6. Also, children with slight or moderate retardation could pass some or all of these tests. Children with severe retardation could pass only a few of them. Most of tests 7 through 15 could be passed by normal children between the ages of 2 and 5. Children with slight retardation could pass several of these tests, children with moderate retardation had great difficulty, and children with severe retardation could rarely pass any of them. Tests 16 through 30 could be routinely passed by normal children between the ages of 5 and 12, but children with even slight retardation had great difficulty with them, and children with moderate and severe retardation usually could pass none.

We see in the Binet–Simon scale a reflection of Binet's belief that intelligence is not a single ability but several. With this belief Binet reflects faculty psychology, although he did not accept the nativism that often accompanies such a rationalistic viewpoint. He did believe that inheritance may place an upper limit on one's intellectual ability, but he also believed that almost everyone functions below their potential. Therefore, he believed strongly that *everyone* could grow intellectually, and that fact should be of prime importance to educators.

In 1908 Binet and Simon revised their scale. Their goal at that time was to go beyond simply distinguishing normal children from children with retardation to distinguishing among levels of intelligence for normal children. The tests were administered to a large number of normal children from ages 3 to 13. If 75% or more of the children of a certain age passed a particular test, the test was assigned to that age level. For example, it was found that only a minority of 3-year-olds could copy a square, but a majority of 4-year-olds (75% or more) could copy a square, and essentially all 5-year-olds could do so. In this way, it could be determined whether a given child was performing at, above, or below average. A 5-year-old passing the tests that most other 5-year-olds also passed was considered to have normal intelligence. But if that child passed only the tests typically passed by 4-year-olds, he or she was thought to have below-average intelligence. And if the 5-year-old passed tests normally passed by 6-year-olds, he or she was thought to have above-average intelligence. In other words, a child's intelligence level was determined by how much higher or lower than the norm the child performed. The 1908 revision of the Binet–Simon scale consisted of 58 tests, each showing the age at which 75% or more of the children perform correctly.

The 1911 revision of the scale included normative data on 15-year-olds and provided exactly five tests for each age level. The latter allowed for a more refined measure of intelligence. For example, if an 8-year-old child passed all the tests corresponding to his or her age, he or she would be considered normal. It is possible, however, that an 8-year-old will also pass some tests typically passed only by 9-year-olds. The new procedure allowed one-fifth of a year to be added to a child's score for each test the child passed beyond those that were the norm for his or her age. Thus, a child's "intellectual level" could be expressed in terms of "intellectual age"—that is, the age corresponding to the most difficult tests the child could pass.

Binet warned that extreme caution should be taken in interpreting a child's intellectual age. For one thing, he observed that it was quite common for children to have an intellectual age that was only one year behind their chronological age and that these children probably would have little trouble in school. Children whose intellectual age was two or more years behind their chronological age would probably have trouble in a standard school program and would need special attention. But even in the latter case, poor test performance did not necessarily mean the child had mental deficiencies. Before such a label was applied, the test administrator had to ensure that the child was healthy and motivated when he or she took the test and that he or she was knowledgeable enough about French culture to understand the test.

Intelligence Quotient. In 1911, German psychologist **William Stern (1871–1938)** introduced the term **mental age**. For Stern, a child's mental age was determined by his or her performance on the Binet–Simon tests. Stern also suggested that mental age be divided by chronological age, yielding an **intelligence quotient (IQ)**. For example, if a particular 7-year-old passed all tests typically passed by 7-year-olds, his or her intelligence quotient would be 7/7, or 1.00. If another 7-year-old passed only those tests typically passed by 5-year-olds, his or her intelligence quotient would be 5/7, or about .71. In 1916 Lewis Terman suggested that the intelligence quotient be multiplied by 100 to remove the decimal point. It was also Terman who abbreviated *intelligence quotient* as IQ. Thus, combining the suggestions made by Stern and Terman, we have the familiar formula for IQ:

$$\text{IQ} = \frac{\text{Mental Age (MA)}}{\text{Chronological Age (CA)}} \times 100$$

Binet was opposed to the use of the intelligence quotient. He believed that intelligence is too complex to be represented by a simple term or number. History shows, however, that Stern's simplifications won out over Binet's opposition. In any case, Binet and Simon had developed a relatively brief, easy-to-administer measure of intelligence, and it became extremely popular. By the beginning of World War I, the Binet–Simon test was being used throughout much of the world.

Binet's Legacy. Binet strongly believed that children with low test scores could benefit considerably if given special attention. Although Binet believed that inheritance may set an upper limit on intellectual potential, he also believed that everyone could grow intellectually if properly stimulated. He worried very much about students in classrooms where teachers believed that students' intellectual performance was innately determined. This, of course, was especially regretful for students believed to have low intelligence:

> I have often observed, to my regret, that a widespread prejudice exists with regard to the educability of intelligence. The familiar proverb, "When one is stupid, it is for a long time," seems to be accepted indiscriminately by teachers with a stunted critical judgment. These teachers lose interest in students with low intelligence. Their lack of sympathy and respect is illustrated by their unrestrained comments in the presence of the children: "This child

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> will never achieve anything…. He is poorly endowed…. He is not intelligent at all." I have heard such rash statements too often. They are repeated daily in primary schools (Binet, 1909/1975, p. 105)

In Binet's (1909/1975) reaction to those who maintained that some children would *never* accomplish certain things, he indicates clearly that he did not accept this view of intelligence:

> "Never!" What a strong word! A few modern philosophers seem to lend their moral support to these deplorable verdicts when they assert that an individual's intelligence is a fixed quantity, a quantity which cannot be increased. We must protest and react against this brutal pessimism. We shall attempt to prove that it is without foundation. (pp. 105–106)

Alternatively, Binet believed that **mental orthopedics** could improve a child's will, attention, and discipline—all abilities that Binet thought were necessary for effective classroom education. Binet (1909/1975) believed that by engaging in mental orthopedics, children learned how to learn:

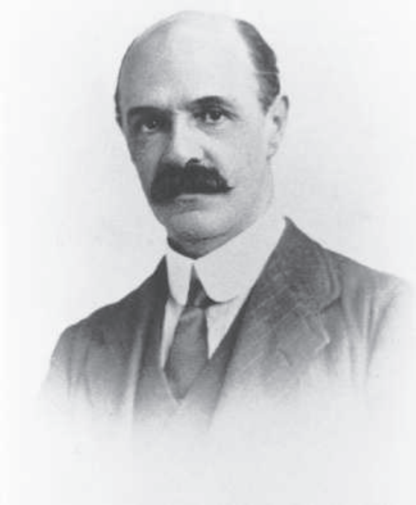
> If we consider that intelligence is not a single function, indivisible and of a particular essence, but rather that it is formed by the chorus of all the little functions of discrimination, observation, retention, etc., the plasticity and extensibility of which have been determined, it will appear undeniable that the same law governs the whole and its parts, and that consequently anyone's intelligence is susceptible to being developed. With practice, training, and above all, method, we manage to increase our attention, our memory, our judgment and literally to become more intelligent than we were before. Improvement goes on in this way until the time when we reach our limit. (p. 107)

Both Binet and Galton died in 1911. Galton was an old man of 89 who had a long, highly productive life; Binet was 54 and at the height of his career.

Charles Spearman

After a military career in the English army that lasted until he was 34, **Charles Spearman (1863–1945)** turned to a career in psychology, studying with both Wundt and Külpe in Germany. Taking a break in his studies with Wundt, Spearman returned to England to serve in the Boer War (1899–1902). Reading Galton thoroughly impressed Spearman, and he performed a number of experiments on village schoolchildren, with results tending to confirm Galton's belief concerning the relationship between sensory acuity and intelligence.

Spearman found that not only did measures of sensory acuity correlate highly among themselves but, more important, they also correlated highly (+.38) with "cleverness in school." In 1904 he published his results in an article titled "'General Intelligence,' Objectively Determined and Measured." In part because of this article, Spearman was offered a position at the University of London, replacing William McDougall (who we will see in Chapter 12) as director of the psychology laboratory.



Charles Spearman

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In order to more thoroughly investigate the nature of intelligence, Spearman laid the groundwork for what became **factor analysis**. Factor analysis is a complex statistical technique based on correlation. The technique begins by measuring either an individual or a group of individuals in a variety of ways. Next, all the measures are intercorrelated to determine which of them vary together in some systematic way. It is assumed that measures (for example, tests) that vary together (that is, are correlated) are measuring the same thing. The final step is to examine the matrix of correlations to determine which measures vary together and how many factors (influences) need to be postulated to account for the intercorrelations observed.

Spearman found that intelligence could be explained by two postulated factors. Individuals differ in their competence in such things as mathematics, language, and music. Such abilities are called *specific factors* (*s*). Because measures of *s* tended to be inter-correlated, Spearman postulated an overriding kind of intelligence that he called a general factor or **general intelligence (g)**. According to Spearman, *g* is determined almost exclusively by inheritance. Spearman, then, had a two-factor theory of intelligence; one factor (*s*) described specific abilities, and the other (*g*) described general intelligence.

Armed with factor analysis and his two-factor theory of intelligence, Spearman attacked the results of studies, such as Wissler's, that showed little intercorrelation among Galton's and Cattell's measures of sensory acuity and almost no correlation between measures of sensory acuity and academic performance. Spearman's conclusions about the nature of intelligence are important for three reasons:

- He emphasized the unitary nature of intelligence, whereas Binet emphasized its diversity.
- He viewed intelligence as largely inherited, whereas Binet viewed it as modifiable by experience.
- It was largely Spearman's conception of intelligence that was embraced by the new testing movement in the United States, not Binet's. That is, IQ was viewed as measuring something like Spearman's *g* rather than Binet's multifarious "intellectual level."

Spearman's Legacy. Spearman's legacy can be seen in two main ways. His hereditarian notion of one underlying factor of intelligence (*g*) remains with us even today, and represents one pole in an ongoing debate about the nature of intelligence. Binet represents the other end of the spectrum, asserting that intelligence was multifaceted and modifiable by experience. We will see this debate continue in the remainder of this chapter.

Like Pearson, Spearman was a pioneer in the area of statistics that are used by psychologists. His early version of factor analysis forms the basis of many modern techniques, and he also developed a nonparametric alternative to Pearson's correlation. Interestingly, given their mutual debt to Galton, their shared interests, and that both were at the same university, the two men were rivals and not friends.

Cyril Burt

Cyril Burt (1883–1971) was born in London, the son of the Galton family physician, and young Cyril was exposed to Galton's ideas about eugenics at an early age. He was a student of William McDougall (and later Külpe) and worked with both Spearman and Pearson at the University of London. Burt accepted Spearman's concept of *g* and believed education should be stratified according to a student's native intelligence. Students of high native intellectual ability should be provided with more challenging educational opportunities than students with low native intellectual ability. Furthermore, Burt believed it is fruitless to try to raise a student's intellectual ability through remedial educational programs.

In 1932 Burt followed Spearman as the Chair of Psychology, and in 1946 he was the first person to be knighted for contributions to psychology (Osborne, 1994). Burt retired from the University of London in 1950 but continued to publish papers providing data supporting the idea that *g* was largely

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inherited. For example, he studied identical (monozygotic) twins reared together and reared apart. He reported that whether reared together or apart the correlation of measures of intelligence for the identical twins was .70 or higher. On the other hand, the correlations between identical twins and their younger or older siblings were only about .40 or .50. These data reinforced the ideas that intelligence was largely innate and that a change of environment would not affect it significantly. In a paper published posthumously, in 1972, Burt summarized the results of his lifelong research on intelligence, including those just described.

The Scandal. Leon Kamin (1974, 1977) reviewed Burt's data as presented in 1972 and found a number of discrepancies suggesting that Burt's data were invented. Oliver Gillie, a British journalist, attempted to contact people whom Burt had listed as having gathered data for him and found that they either did not exist or had never gathered data. Gillie (1977) called for the establishment of a committee to help expose fraud in science. Finally, in his biography of Burt, Leslie Hearnshaw (1979) charged that Burt had published fraudulent data, supporting his position under a pseudonym and published with a coauthor who did not exist.

It appeared that the case against Burt was clearly established. However, some argued that the matter was either exaggerated or not proven (for example, Joynson, 1989). Instead of fraud, there had been only sloppy methods and inappropriate attempts to recover data destroyed by Nazi air raids, and others even claimed to have known his fictitious coauthor (Fletcher, 1991). After reviewing several postwar incidents, including a confounding of his own accomplishments with those of Spearman, Gould (1981, p. 237) posits that Burt was not a "rational man." In sum, Green (1992) concluded, "The charge of deliberately falsifying data can neither be established nor disproved with certitude" (p. 331). For more details on the Burt scandal, see also Samelson (1992, 1993).

It is interesting to note that Burt's conclusions, whether real or fabricated, have been essentially confirmed by other researchers, who, like Burt, studied identical twins. For example, Raymond B. Cattell (1905–1998), who also studied with Spearman, concluded that intelligence was about 65% genetically determined (Cattell, 1982). One of Burt's most controversial followers, Arthur Jensen (1981, 1985) argued for an even greater nature effect (.74) and even smaller nurture influence (.16) based on his twin studies.

In the end, perhaps, the Burt episode taught us more about the politics of science than about the nature of intelligence. Among Burt's supporters were those who believed that the high heritability of intelligence had been proven scientifically and this fact has, or ought to have, implications of social and educational policy. Such views, once linked to race, were what made Jensen so controversial (see Jensen, 1969).

On the other hand, Burt's critics believed "not just that the evidence for IQ heritability is unpersuasive but that, in any event, increased educational assistance for some students is based on moral, not scientific principles" (Tucker, 1997, p. 156). This controversy between "conservatives" (nativists) and "liberals" (nurturists) was rekindled by the publication of Herrnstein and Murray's *The Bell Curve: Intelligence and Class Structure in American Life* (1994). We will discuss *The Bell Curve* later in this chapter.

INTELLIGENCE TESTING IN THE UNITED STATES

Henry Herbert Goddard

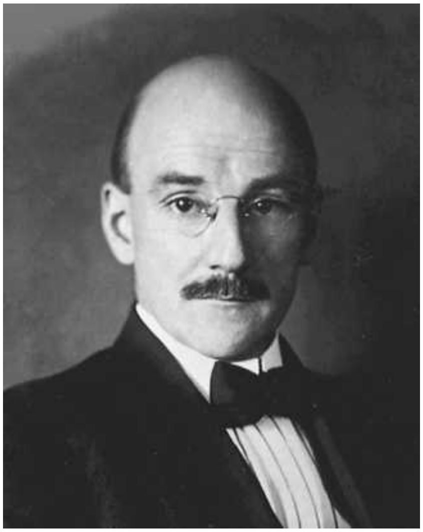
Henry Herbert Goddard (1866–1957) was born into a New England Quaker family and obtained his bachelor's and master's degrees from Haverford College. After being a high school teacher and then principal for several years, he enrolled in the doctoral program in psychology at Clark University to pursue his interests in education and psychology. Goddard did his doctoral dissertation, which investigated the psychological factors involved in faith healing, under the supervision of G. Stanley Hall (see Chapter 11). After completing his degree in

1899, Goddard first accepted a teaching position at Pennsylvania's State Normal School, and then in 1906 he became director of research at the New Jersey Training School in Vineland, which was established for the education and care of "feeble-minded" (Goddard's term) children.

It was Goddard who translated the Binet–Simon scale into English. Although initially skeptical of the scale, he found it to be very effective in classifying children in terms of their degree of retardation. Goddard then translated all of Binet and Simon's works into English and, following Binet's death in 1911, became the world's leading proponent of Binet's approach to measuring intelligence. However, although accepting Binet's testing procedures, Goddard accepted the Galton–Cattell–Spearman (hereditarian) view of the nature of intelligence rather than Binet's.

In addition to administering the translated Binet–Simon scale to the children at the Training School, Goddard also administered it to 2,000 public school students in New Jersey. He was shocked to find that many of the public school students performed below the norms for their ages. This especially disturbed Goddard because of his belief that intelligence was largely inherited—a belief he thought was supported by the observation that the children at Vineland often had brothers and sisters who were "feeble-minded."

Study of the "Kallikak" Family. Goddard decided to investigate the relationship between family background and intelligence more carefully. In 1911 he administered the Binet–Simon scale to a young woman he called Deborah Kallikak, who had been living at the Training School since 1897. "Kallikak" was a fictitious name that Goddard created out of the Greek words *kalos* (good) and *kakos* (bad). Although Deborah's chronological age was 22, her test performance yielded a mental age of 9, producing an IQ of about 41. Goddard coined the term *moron* to denote Deborah's intellectual level. He then traced Deborah's ancestry back to the American Revolution, when Martin Kallikak, Sr., had had a relationship with a "feeble-minded" barmaid that resulted in the birth of Martin Kallikak, Jr. After leaving the army, the elder Martin married a "worthy girl," and they had seven children. The younger Martin eventually married and had 10 children. In Goddard's analysis, the descendants of the elder Martin and the "worthy girl" represented the "good" side of Deborah's ancestry, and the descendants of the younger Martin represented the "bad" side.



Henry Herbert Goddard

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Goddard found that of the elder Martin's children, none were feeble-minded, whereas five of the younger Martin's children were. In subsequent generations on the younger Martin's side, Goddard found an abundance of individuals with mental deficiencies. In Goddard's time, people believed that feeble-mindedness was the cause of most criminal, immoral, and antisocial behavior; and Goddard supported this belief by showing that many descendants of the younger Martin had been horse thieves, prostitutes, convicts, alcoholics, parents of illegitimate children, and sexual deviates. Of the hundreds of descendants from the elder Martin's marriage, only three had had mental deficiencies, and one had been considered "sexually loose." Among the elder Martin's descendants had been doctors, lawyers, educators, and other prestigious individuals.

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Goddard reported his findings in *The Kallikak Family: A Study in the Heredity of Feeble-Mindedness* (1912). His research was taken as support for the Galtonian belief that intelligence was genetically determined. Along with Goddard, several leading scientists of the day urged that those with mental deficiencies be sterilized or segregated from the rest of society. They contended that because the feeble-minded could not be expected to control their own reproduction, the intelligent members of society must control it for them:

> If both parents are feeble-minded all the children will be feeble-minded. It is obvious that such matings should not be allowed. It is perfectly clear that no feebleminded person should ever be allowed to marry or to become a parent. It is obvious that if this rule is to be carried out, the intelligent part of society must enforce it. (Goddard, 1914, p. 561)

No fewer than 20 states passed sterilization laws, and thousands of "undesirables" were sterilized. In some states, the sterilization law was enforced until the 1970s.

Mental Testing and Immigration. In the years from 1905 to 1913, millions of individuals emigrated from Europe to the United States, and there was growing concern that many of these immigrants might have mental deficiencies. The question was how to know for certain. In 1912 the commissioner of immigration invited Goddard to Ellis Island to observe the immigrants. Goddard claimed he could tell that many of the immigrants had mental deficiencies simply by observing their physical characteristics, but to be sure he administered the Binet–Simon scale. On the basis of the test results, many immigrants were labeled "mentally defective," and thousands were deported. Goddard even went so far as to specify the European countries for which the percentage of immigrants with mental deficiencies was the highest. In general, Goddard concluded that between 40% and 50% of the immigrants were "morons."

As with his earlier work, Goddard assumed that the immigrants' test performance was due mainly to inherited intelligence and not to educational, cultural, or personal experience—all factors that were later found to influence test performance. But the immigrants were also taking the test under special circumstances:

> For the evident reason, consider a group of frightened men and women who speak no English and who have just endured an oceanic voyage in steerage. Most are poor and have never gone to school; many have never held a pencil or pen in their hand. They march off the boat: one of Goddard's [assistants] takes them aside shortly thereafter, sits them down, hands them a pencil, and asks them to reproduce on paper a figure shown to them a moment ago, but now withdrawn from their sight. Could their failure be a result of testing conditions, of weakness, fear, or confusion, rather than of innate stupidity? Goddard considered the possibility, but rejected it. (Gould, 1981, p. 166)

Furthermore, the tests were administered by a translator whose accuracy in translating the test into the immigrant's native tongue was taken on faith. Because of Goddard's efforts, the rate of deportation increased 350% in 1913 and 570% in 1914—although he regretted the loss to the United States of inexpensive labor.

Lewis Madison Terman

Lewis Madison Terman (1877–1956) was born the 12th of 14 children to a farming family from central Indiana. At age 9, a phrenology book salesman gave each member of the Terman family a phrenological analysis. Terman's analysis indicated great promise, thus stimulating him to aspire for a life beyond the farm. He went to a one-room school and completed the eighth grade when he was 12 years old. At age 15, Terman left to attend Central Normal College in Danville, Indiana. At age 17, he began teaching in a rural school. Within six years after leaving home, Terman had taught school and earned three undergraduate degrees: one in arts, one in sciences, and one in pedagogy. The next three years were busy ones for Terman; he became a high school principal, a husband, and a father.

In 1901, Terman enrolled at Indiana University, where he pursued a master's degree in pedagogy. Upon completing this degree, he received the offer for doctoral study at Clark University. With financial support from his family, Terman was able to accept, and soon he was off to study with G. Stanley Hall. Terman did not write his dissertation under Hall's supervision, however. Terman became increasingly interested in mental testing, and Hall had little enthusiasm for the topic. Under the supervision of Edmund C. Sanford (who was APA president in 1902), Terman isolated a group of "bright" students and a group of "dull" students and then attempted to determine what types of tests could be used to differentiate between the two groups. Terman was unaware that Binet and Simon had already done essentially the same thing earlier. Terman's dissertation was titled "Genius and Stupidity: A Study of the Intellectual Processes of Seven 'Bright' and Seven 'Stupid' Boys." Terman was to say later in his life that all of his career interests were shaped during his years at Clark.

Before obtaining his doctorate from Clark University in 1905, Terman had become seriously ill with tuberculosis, and although he recovered, he thought it best that he choose a warm climate in which to work. For that reason, he accepted the position of high school principal in San Bernardino, California. A year later, he began teaching child study and pedagogy at Los Angeles State Normal School (later to become the University of California, Los Angeles). In 1910 Terman accepted an appointment to the education department at Stanford University, where he spent the rest of his career. He became chair of the psychology department in 1922, a position he held until his retirement in 1942. In 1923, Terman also served as president of the American Psychological Association.

Lewis Madison Terman

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It was coincidental with his arrival at Stanford that Terman became aware of the Binet–Simon intelligence scale (through Goddard's translation). Terman began immediately to work with the scale and found that it could not be used on U.S. children without modifications.

The Stanford–Binet Tests. Terman found that when the Binet–Simon scale was administered to U.S. children, the results were uneven. For example, Terman observed that items from the Binet–Simon scale were too easy for 5-year-olds and too difficult for 12-year-olds. This caused the mental age of average 5-year-olds to be artificially high and that of average 12-year-olds to be artificially low. Working with his graduate student, H. G. Childs, Terman deleted existing items from the Binet–Simon scale and added new items until the average score of a sample of children was 100, no matter what their age. This meant that for each age group tested, the average mental age would equal the group's chronological age. Terman and Childs published their first revision of the Binet–Simon tests in 1912, and in 1916 Terman alone published a further revision.

The 1916 revision became known simply as the Stanford–Binet. It was in 1916 that Terman adopted Stern's "intelligence ratio" and suggested that the ratio be multiplied by 100 to remove the decimal and to call the ratio IQ. The Stanford–Binet, which made Terman both rich and famous, was revised in 1937 and again in 1960 (after

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Terman's death). Incidentally, Wolf (1973) noted that Terman bought the legal rights to translate the Binet–Simon scale into English for one dollar.

Terman's Position on Inheritance. Throughout his career, Terman believed that intelligence was largely inherited. Furthermore, Terman, like Goddard, believed that low intelligence was the cause of most criminal and other forms of antisocial behavior. For Terman (1916), a stupid person could not be a moral person:

> Not all criminals are feeble-minded, but all feeble-minded persons are at least potential criminals. That every feeble-minded woman is a potential prostitute would hardly be disputed by anyone. Moral judgment, like business judgment, social judgment, or any other kind of higher thought process, is a function of intelligence. Morality cannot flower and fruit if intelligence remains infantile. (p. 11)

And in 1922 Terman said,

> There is nothing about an individual as important as his IQ, except possibly his morals.… [T]he great test problem of democracy is how to adjust itself to the large IQ differences which can be demonstrated to exist among the members of any race or nationality group.… All the available facts that science has to offer support the Galtonian theory that mental abilities are chiefly a matter of original endowment.… It is to the highest 25 per cent. of our population, and more especially to the top 5 per cent., that we must look for the production of leaders who will advance science, art, government, education, and social welfare generally.… The least intelligent 15 or 20 per cent. of our population … are democracy's ballast, not always useless but always a potential liability. How to make the most of their limited abilities, both for their own welfare and that of society; how to lead them without making them helpless victims of oppression; are perennial questions in any democracy. (Minton, 1988, p. 99)

Although Terman was impressed by and borrowed much from Binet, his view of intelligence was much more like that of Galton. Terman was so struck by Galton that he published an intellectual portrait of him in which he estimated Galton's IQ to be nearly 200 (Terman, 1917).

Terman's contention that IQ is a valid measure of native intelligence did not go unchallenged. Among Terman's harshest critics was the journalist Walter Lippmann. Lippmann and Terman debated in a series of articles appearing in the *New Republic* between 1922 and 1923. In one of these articles Lippmann (1923) wrote,

> I hate the impudence of a claim that in fifty minutes you [Terman] can judge and classify a human being's predestined fitness in life. I hate the pretentiousness of that claim. I hate the abuse of scientific method which it involves. I hate the sense of superiority which it creates and the sense of inferiority which it imposes. (p. 46)

Terman validated the Stanford–Binet by correlating test performance with teacher ratings of academic performance, teacher estimations of intelligence, and school grades. He found fairly high correlations in each case, but this was not surprising because the traits and abilities that schools and teachers valued highly in students were the same traits and abilities that yielded high scores on the Stanford–Binet. Nonetheless, the correlations meant that academic performance could be predicted with some success from test performance.

Terman's Study of Genius. In Terman's day, it was widely believed that very bright children were abnormal in more than a statistical sense. One common expression describing such children was "early ripe, early rot," suggesting that if mental ability developed too fast at an early age, not enough would remain for the later years. To objectively study the experience of bright children through the years, Terman ran one of the most famous studies in psychology's history. By identifying highly intelligent children and observing them over a long period of time, Terman could evaluate his belief that those with high IQs are more successful in life than those with lower IQs.

As his first step, Terman defined genius as a score of 135 or higher on his test. Next, he and his colleagues administered the test to thousands of California schoolchildren, and he isolated 1,528 gifted children (856 boys and 672 girls). The average chronological age of the group was 11, and the average IQ of the group was 151. Learning everything he could about his subjects—including their interests, family history, health, physical characteristics, and personality—Terman wanted to study the experiences of group members as they matured through the years. He began his study in 1921 and reported the first results in *Genetic Studies of Genius* (1926). The term *genetic* can have two meanings. First, it can mean "developmental." When the term is being used in this sense, a genetic study is one that traces how something varies as a function of maturation, or time. Second, *genetic* can refer to the genes or chromosomes responsible for various traits. Terman used the term in the developmental sense.

Terman found that the children in his study (who referred to themselves as "Termites") had parents with above-average educational backgrounds, had learned to read at an early age, participated in a wide range of activities, and produced schoolwork that was usually excellent. All of this might have been expected; the major question was how these children would fare as they became older. Terman did follow-up studies in 1927–1928, when the average age of the group was about 16, and again in 1939–1940, when the average age was about 29. These studies indicated that test scores were still in the upper 1% of the general population, that members of the group still participated in a wide variety of activities and excelled in most of them, and that they were still outstanding academically. Seventy percent of the men and 67% of the women had finished college, and 56% of the men and 33% of the women had gone on for at least one advanced degree. All these percentages were far higher than for the general population at the time.

In 1947 Terman appeared on the radio show *Quiz Kids*. On the show, bright, healthy children were asked extremely difficult questions to which they typically knew the answers. Terman appeared on the program because he felt that it was responsible for correcting many of the misconceptions about gifted children. In fact, Terman thought the program did more in that regard than his own work had done:

> I have devoted a good part of my life to research on children of high I.Q.… But despite all my investigations, and those of others, many people continued to think of the brainy child as a freak—physically stunted, mentally lop-sided, nonsocial, and neurotic. Then came the *Quiz Kids* program, featuring living specimens of highly gifted youngsters who were obviously healthy, wholesome, well-adjusted, socially minded, full of fun, and versatile beyond belief.... Result: the program has done more to correct popular misconceptions about bright children than all the books ever written. (Minton, 1988, pp. 222–223)

It is probably best that it was not until after Terman's death that it was discovered that the "quiz kids" were often given their questions in advance of the show.

The final follow-up in which Terman participated took place in 1950–1952, and it showed that members of the group continued to excel in most of the categories studied. By that time, many members of the group had attained prominence as doctors, lawyers, teachers, judges, engineers, authors, actors, scientists, and businesspeople. Upon Terman's death in 1956, the directorship of the investigation was taken over by Robert R. Sears, a Stanford professor who was one of Terman's Termites. Sears also served as APA president in 1951.

In the 1970s, two other Stanford professors were added to the investigation team, Lee J. Cronbach (1916–2001; another APA president, 1957, and Termite) and Pauline S. Sears, Robert's wife. In the tradition of Pearson and Spearman, Cronbach is perhaps even better known for his work in psychometrics. Many of the ways psychologists assess the reliability, validity, and generalizability of their studies are based on his contributions to statistics. Another data collection phase of the study was completed in 1986 under the supervision of Robert Sears and Albert Hastorf, who took over the project after Sears died in 1989.

The group of gifted individuals identified by Terman in 1921 has been studied intensely for more than 80 years, and the study continues. For example, Tomlinson-Keasey and Little (1990) examined 1,069 of the original 1,528 Termites and found that, although generally successful and well-adjusted, some were more successful and well-adjusted than others. The authors isolated the variables related to differential achievement and personal adjustment levels so that they may be used to predict and enhance the achievement and adjustment of other gifted individuals. Friedman et al. (1995) examined the backgrounds of a sample of Terman's Termites who were deceased as of 1991. They found that certain psychosocial and behavioral variables were significant predictors of premature mortality, such as parental divorce during childhood, unstable marriage patterns during adulthood, certain childhood personality characteristics (such as being unconscientious), psychological instability in adulthood, and unhealthy habits (such as excessive smoking and drinking).

For the researchers involved in Terman's longitudinal study, the primary results were clear: *The gifted child becomes a gifted adult.* Terman believed strongly that giftedness was inherited, but subsequent researchers have shown that many of Terman's results can be explained by taking into account the group members' experiences. How much of intelligence is genetically determined and how much is environmentally determined are still hotly contested questions in psychology. Most modern researchers, however, concede that both factors are important. In any case, Terman's longitudinal study of gifted individuals clearly showed that individuals who score high on so-called measures of intelligence early in life do not deteriorate later in life. In fact, his results showed that those who fare best in youth also tend to fare best as mature adults.

Leta Stetter Hollingworth

For Terman, the primary purpose of mental testing was the identification of gifted individuals so that they could be encouraged to reach their full potential and become societal leaders. He believed that a tracking system whereby gifted students are provided educational experiences different from those provided for nongifted children is essential for the survival of democracy. Mainly through the efforts of Terman and his colleagues, intelligence testing and ability grouping were common practices in U.S. elementary schools by 1930. However, Terman had no specific recommendations concerning the educational methods that should be adopted in meeting the needs of intellectually superior children. It was **Leta Stetter Hollingworth (1886–1939)** who was primarily concerned with developing educational strategies that would ensure the developmental well-being of gifted students.

Born Leta A. Stetter, Hollingworth attained her bachelor's degree from the University of Nebraska. In 1908 Hollingworth, who had been teaching school in Nebraska, accompanied her husband, Harry, to New York where he had been hired as a psychology instructor at Barnard College,

Leta Stetter Hollingworth

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Columbia University. Harry L. Hollingworth himself went on to gain considerable prominence as a psychologist. Earning his PhD under Cattell at Columbia, he wrote 25 books on psychological topics and served as president of the American Psychological Association in 1927. Leta Hollingworth intended to continue teaching in New York but discovered that the city had a policy of not employing married women as teachers. She decided to enroll as a graduate student at Columbia University, where she took courses from Edward L. Thorndike (see Chapter 11), who became her advisor. It was through Thorndike that she developed an interest in psychological testing. However, Hollingworth was also interested in the many misconceptions about women that were prevalent at the time. To her surprise, Thorndike agreed to supervise her dissertation on "Functional Periodicity," which investigated the notion that women are psychologically impaired during menstruation. She found no evidence for such impairment (Hollingworth, 1914).

Hollingworth also challenged the widely accepted beliefs that intelligence is largely inherited and that women are intellectually inferior to males. At the time, Thorndike was among those who shared these beliefs. Hollingworth (1940) believed that women reach positions of prominence less often than males not because of intellectual inferiority but because of the social roles assigned to them:

> Why do we not consider first the established, obvious inescapable fact that women bear and rear the race, and that this has always meant, and still means that nearly 100% of their energy is consumed in the performance and supervision of domestic and allied tasks, a field where eminence is impossible. No one knows who is the best housekeeper in America. Eminent housekeepers do not and cannot exist. If we discuss at all the matter of sex differences in achievement, we should consider first the most obvious conditioning factors. Otherwise our discussion is futile scientifically. (p. 16)

Thorndike later modified his views on intelligence to stress nurture more than nature. Hollingworth believed that she was at least partially responsible for his revised beliefs. She also discussed with Terman her belief that more men than women are classified as gifted not because of differential intellectual abilities but because of social factors. Terman did eventually modify his nativistic position concerning gender differences in intelligence, allowing for social influences, but he maintained his belief that intelligence was primarily genetically determined.

After receiving her master's degree in 1913, Hollingworth worked for a while as a clinical psychologist at the New York City Clearing-House for Mental Defectives, where she administered Binet tests. She then worked at Bellevue Hospital as a clinical psychologist until attaining her doctorate from Columbia University in 1916. Soon thereafter she became a professor of education at Teachers College, Columbia University. Her work at the Clearing-House made her realize that there were as many myths about so-called mentally defective individuals as there were about women. For example, she found that many individuals classified as "defective" were in reality manifesting social and personal adjustment problems. In a series of books, Hollingworth attempted to correct this and related problems: *The Psychology of Subnormal Children* (1920); *Special Talents and Defects: Their Significance for Education* (1923); and *The Psychology of the Adolescent* (1928). The last replaced G. Stanley Hall's text (see Chapter 11) as the standard in the field.

Hollingworth next concentrated her attention on the education of gifted children. She observed that simply classifying a child as gifted is not enough. Emphasizing abstract test scores or group characteristics causes the needs of individual students to often be overlooked. As an example, she described the experience of a gifted 8-year-old girl named Jean who typically finished her assignments more quickly than her classmates. The teacher's reaction to this problem was to have Jean write digits in a book over and over until her classmates could finish their assignments:

> Jean had with her the copy books in which she had been writing for the past year, one

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> digit after another by the hour. Jean's mother said, "She can't stand the numbers any longer. Her hand gets stiff." I wish you could see the thousands of rows of digits obediently inscribed by this intelligent child, till finally she burst out crying, "I can't stand the numbers anymore." (Hollingworth, 1940, p. 127)

Correcting such mistreatment of gifted children occupied Hollingworth for the rest of her career. In 1926 she published *Gifted Children*, which became the standard text in schools of education for many years, and *Children Above 180 I.Q.* was published posthumously in 1942. For more about this impressive woman and her role in the history of psychology, see Benjamin (1975) and Shields (1975, 1991).

INTELLIGENCE TESTING IN THE ARMY

Robert M. Yerkes

Robert M. Yerkes (1876–1956) was the firstborn son from a rural Pennsylvania farm family. He was disillusioned by farm life, however, and dreamed of becoming a medical doctor. During his college years, Yerkes lived with an uncle for whom he did chores in return for tuition to Ursinus College. After Ursinus, Yerkes went to Harvard, where he became interested in animal behavior. Obtaining his doctorate in 1902, he remained at Harvard as a faculty member. With his friend John B. Watson (see Chapter 12), who was then at Johns Hopkins University, Yerkes established comparative psychology in the United States. In recognition of his ultimate success, Yerkes was elected president of the APA in 1917, and the United States' leading primate research facility now honors his name.

As a student, Yerkes had had to borrow considerable amounts of money, and his faculty post at Harvard did not pay very much. This meant that he had to take part-time jobs in order to survive financially. Hence, in 1912 he took the job as the director of psychological research at the Boston Psychopathic Hospital; it was here that Yerkes had his first experience with intelligence testing. At the hospital, the Binet–Simon scale was being explored as an instrument to aid clinical diagnoses. One of Yerkes's Harvard professors, and now his friend and colleague, was the biologist Charles Davenport, who corresponded with Galton and was a leader in the U.S. eugenics movement.

Yerkes's contribution to intelligence testing was his suggestion that all individuals be given all items on the Binet–Simon test and be given points for the items passed. Thus, a person's score would be in terms of total points earned instead of an IQ. This removes age as a factor in scoring. The traditional procedure followed in administering the Binet–Simon scale was to locate the range of tests appropriate for a given individual. For example, if a 7-year-old was being tested, the tests appropriate for that age would be given. If the child missed any of those tests, the tests appropriate for the next lowest age (6) would be administered. If, in this case, the child initially passed all tests appropriate for the 7-year-old level, tests from the 8-year-old level would be administered, and so forth until the child began to fail tests. In other words, using age as a frame of reference, the testing procedure was customized for each child. Yerkes's "point-scale" procedure rendered all of this unnecessary. Yerkes did

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Robert M. Yerkes

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point out, however, that point norms could be established for various ages or for any group one wanted to compare. Yerkes believed that, besides being easier to administer, point scores were more amenable to statistical analyses than IQ scores. Also, because with point scores all individuals take the same tests without regard to their age or level, Yerkes's method is conducive to group testing, whereas the Binet–Simon test has to be given to one person at a time. Soon Yerkes would see his method tried on a level he never dreamed possible.

The Army Testing Program. When the United States entered World War I in 1917, Yerkes was president of the APA. He called a special meeting of the association to determine how psychologists could help in the war effort. It was decided that one way psychologists could contribute was by devising means for selecting and evaluating recruits into the armed forces. Upon Goddard's invitation, a small group of psychologists, including Yerkes and Terman, went to the Vineland Training School to develop psychological tests that were then tried at various army and navy bases. The results were encouraging, and Yerkes was made an army major and given the job of organizing a testing program for the entire army (the navy rejected the idea). The goals of the program were to identify those with mental deficiencies, to classify men in terms of their intelligence level, and to select individuals for special training—for example, to become officers. Yerkes believed that, to be effective, the test used had to be a group test rather than an individual test, had to measure "native" intelligence, and had to be easy to administer and score. Using Yerkes's point-score method of scoring, the group created a test that met these criteria; however, they found that 40% of the recruits could not read well enough to take the test. The group solved the problem by creating two forms of the test: the Army Alpha for literate individuals and the Army Beta for illiterate individuals or for those who spoke and read a language other than English.

The war ended in 1918, and the testing program was terminated in 1919, by which time more than 1.75 million individuals had been tested. Many people claimed that the army testing program had demonstrated psychology's practicality. Be that as it may, Samelson (1977) reports that only 1 in 200 of those tested were recommended for discharge as mentally unfit, and in many cases the army ignored such recommendations. In his evaluation of the army testing program under Yerkes's leadership, Reed (1987) reached the following conclusion:

> In retrospect, Yerkes's greatest coup as a scientific bureaucrat and promoter was not in getting the Surgeon General to find a place for psychologists in the army, although that was a notable accomplishment, nor in writing tests, recruiting several hundred officers and technicians, and administering examinations to over 1.7 million individuals, despite fierce competition for resources and status from army officers and psychiatrists, although that too was a notable accomplishment. His most remarkable achievement was the myth that the army testing program had been a great practical success and that it provided a "goldmine" of data on the heritability of intelligence. (p. 84)

The Deterioration of National Intelligence

The use of the Army Alpha and Beta tests rekindled eugenic concerns about the deterioration of the nation's intelligence level. About half of the white males tested in the army had native intelligence equal to that of a 13-year-old or lower, and the situation was even worse for black soldiers. Goddard's response was that people with low mental ability should not be allowed to vote. Along with Goddard, Terman and Yerkes were very concerned about the deterioration of the nation's intelligence, which they believed was caused by immigration and the fact that "intellectually inferior" individuals were reproducing faster than normal or above-normal individuals.

As was common at the time, Yerkes (1923) believed that many of the nation's ills were being

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caused by people of low intelligence and that immigration policies were only aggravating the problem:

> By some people meagre intelligence in immigrants has been considered an industrial necessity and blessing; but when all the available facts are faced squarely, it looks more like a burden. Certainly the results of psychological examining in the United States Army establish the relation of inferior intelligence to delinquency and crime, and justify the belief that a country which encourages, or even permits, the immigration of simple-minded, uneducated, defective, diseased, or criminalistic persons, because it needs cheap labor, seeks trouble in the shape of public expense.
>
> It might almost be said that whoever desires high taxes, full almshouses, a constantly increasing number of schools for defectives, of correctional institutions, penitentiaries, hospitals, and special classes in our public schools, should by all means work for unrestricted and non-selective immigration. (p. 365)

However, as we have seen, this extremely nativistic position that Goddard, Terman, and Yerkes represented did not go unchallenged. More and more, people realized that performance on so-called intelligence tests could be at least partially explained by such factors as early experience and education. Rather than simply measuring native intelligence, the tests were apparently also measuring personal achievement and the influence of life's circumstances. Gould (1981) notes that test items included questions about brand name food products, baseball players, tennis, bowling, and phonographs. It followed that the more privileged a person was in terms of enriching experiences and education, the higher his or her scores would be on so-called intelligence tests. For example, African American scholar Horace Mann Bond observed that blacks living in the north typically scored higher on intelligence tests than those living in the south (Urban, 1989).

The book *The Bell Curve: Intelligence and Class Structure in American Life* (1994), by Richard J. Herrnstein and Charles Murray, reflects many of the same beliefs about intelligence accepted by Galton, Cattell, Spearman, Burt, Goddard, Terman, and Yerkes. Herrnstein and Murray organize their book around six conclusions, or points, about intelligence that are "beyond dispute." By "beyond dispute," they mean the following:

> That if you gathered the top experts on testing and cognitive ability, drawn from all points of view, to argue over these points, away from television cameras and reporters, it would quickly become apparent that a consensus already exists on all of the points, in some cases amounting to near unanimity. (p. 23)
>
> Here are the six points:

1. There is such a thing as a general factor of cognitive ability on which human beings differ.
2. All standardized tests of academic aptitude or achievement measure this general factor to some degree, but IQ tests expressly designed for that purpose measure it most accurately.
3. IQ scores match, to a first degree, whatever it is that people mean when they use the word *intelligent* or *smart* in ordinary language.
4. IQ scores are stable, although not perfectly so, over much of a person's life.
5. Properly administered IQ tests are not demonstrably biased against social, economic, ethnic, or racial groups.
6. Cognitive ability is substantially heritable, apparently no less than 40 percent and no more than 80 percent. (pp. 22–23)

Not on the list, but featured in the book, is the contention that in the United States the best jobs and the highest income tend to go to the most intelligent individuals, the "cognitive elite." The less intellectually endowed are doomed to menial labor in our information-based economy. Couple this with the fact that (according to Herrnstein and Murray) intelligence is largely inherited, and we have a major

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problem—that is, an economic class structure based on inherited intelligence. Of course, each of their "indisputable points" about intelligence has been hotly disputed (see, for example, Azar, 1994, 1995a, 1995b; DeAngelis, 1995; Jacoby & Glauberman, 1995; *The New Republic*, 1994).

According to Zenderland (1997), *The Bell Curve* touched "an ever-sensitive national nerve—a nerve exposed by the questions it raised concerning race, class, and social equality" (p. 135). Weidman (1997) describes the controversy as a culture war that

> pits the academic left—the believers in the importance of nurture, or environment—against the conservatives—the believers in nature, hereditary endowment, innate capacity. The conservatives accuse the leftists of being in "biodenial," of misunderstanding and greatly underestimating the role that biology plays in determining behavior. The leftists reply that behavior is malleable, that no one is congenitally unteachable, that anyone can become anything, given the right environment. In this nature/nurture skirmish, *The Bell Curve* has come down solidly on the conservative side. (p. 143)

Such a controversy reflects widely different worldviews and cannot be resolved by science; both sides claim to be supported by the facts. In the recent history of the nature–nurture debate, there has been an emotional upheaval when any idea suggesting biological determinism has been proposed. Perhaps greater understanding of these debates will come when it is realized that they are essentially moral, philosophical, or political but not scientific.

MODERN TESTING

Currently there is little agreement even on an adequate definition of intelligence. When 24 prominent researchers in the field of intelligence were asked to define intelligence, they provided 24 different definitions (Sternberg & Detterman, 1986).

Central to the problem is the issue we introduced with Spearman and Binet: Is intelligence one generalized factor or a collection of many different attributes?

Spearman's "side" includes most of the figures we have considered thus far, as well as their extensive research and psychometric sophistication. Joy Paul Guilford (1897–1987) and Louis L. Thurstone (1887–1955) were among the first two American psychologists to offer a scholarly alternative, and both would be honored by serving as APA president. From WW II onward, Guilford's empirical work on over 100 discrete mental and behavioral attributes was embraced by the U.S. military (for example, Guilford, 1967). Thurstone actually advanced Spearman's own factor analytic methods, and his work (for example, Thurstone, 1938) suggests seven intelligence factors (verbal comprehension, word fluency, use of numbers, spatial visualization, associative memory, perceptual speed, and reasoning). Various psychometric contributions by Thurstone can be seen in virtually all modern aptitude, achievement, and intelligence tests (including the Stanford–Binet). Robert Sternberg's (for example, 1986) three factor model has been widely embraced in recent years, essentially accepting the traditional factor, but including considerations for experience and context. Still, there is no universally agreed upon answer to the question.

Psychometrics. In addition to the previously noted contributions of Chronbach and Thurstone, several other important American psychologists have distinguished themselves in the area of statistics and psychometrics. We will mention just three whose work led to them being elected as president of the APA. Quinn McNemar (1900–1986; APA president in 1964) completed his doctorate with Terman, then did postdoctoral work with Thurstone. He was responsible for many of the various psychometric advances made to the Stanford–Binet, and published the classic *Psychological Statistics* in 1949. His research found little predictive difference between a single factor or multiple factor measure of IQ. Anne Anastasi (1908–2001;

APA president in 1972) was a student of Hollingworth and Thorndike, and drawn to psychology from mathematics by an interest in Spearman's factor analysis. Anastasi (1980) described her career as being focused on how matters such as experience and environment impacted development, and is best known for her extensive work on making psychological tests valid measures. Paul Meehl (1920–2003; APA president in 1962) remains the best known "watchdog" of psychological methods. Among Meehl's concerns was the recognition that psychology relies on constructs—such as intelligence—that often differ significantly from the entities studied by the natural sciences (for example, Cronbach & Meehl, 1955; Meehl, 1954, 1978).

David Wechsler

Yerkes efforts in WW I radically changed how IQ tests were administered and scored, especially for adults. Just before WW II, **David Wechsler (1896–1981)** developed a new intelligence test to better understand his adult clients at Bellevue Hospital, the same facility where Leta Hollingworth had once worked. Wechsler was born an East European Jew, one of the groups most singled out by Goddard as unfit for immigration (Wechsler came to the United States at age 6). During WW I, Wechsler served as a volunteer scorer of the IQ tests being administered to U.S. soldiers. In 1919, he went to the University of London and studied with both Pearson and Spearman. After returning, he completed his Ph.D. with Woodworth at Columbia—who we will see in the next chapter.

David Wechsler

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Wechsler resolved some of the psychometric issues that had been identified in the original Stanford–Binet and the Army Alpha and Beta by no longer producing a score linked to age. Instead, the average score on his test was set at 100, and higher and lower performances were evaluated against deviations from that standard. Wechsler revised his test during and after WWII, eventually producing both the WAIS (Wechsler Adult Intelligence Scale) and WISC (Wechsler Intelligence Scale for Children). In turn, the Stanford–Binet was revised to match Wechsler's scoring. Although numerous other scales have been developed, the WAIS and WISC along with the Stanford–Binet remain the most widely used.

After reviewing which of the many notions concerning intelligence have scientific support and which do not, Neisser et al. (1996) concluded the following:

> In a field where so many issues are unresolved and so many questions unanswered, the confident tone that has characterized most of the debate on these topics is clearly out of place. The study of intelligence does not need politicized assertions and recriminations; it needs self-restraint, reflection, and a great deal more research. The questions that remain are socially as well as scientifically important. There is no reason to think them unanswerable, but finding the answers will require a shared and sustained effort as well as the commitment of substantial scientific resources. (p. 97)

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SUMMARY

Evolutionary theory has existed in one form or another since the time of the early Greeks. Lamarck claimed that traits acquired during an individual's lifetime that are conducive to survival are passed on to the individual's offspring. Spencer originally followed Lamarck by saying that frequently used associations are passed on to offspring in the form of reflexes and instincts. Later, Spencer accepted Darwin's version of evolutionary theory and applied it to society, saying that society should allow enough freedom so that those most fit for survival could differentiate themselves from those least fit for survival. This was called social Darwinism.

After his five-year journey aboard the *Beagle*, Darwin realized that in different locations members of a species possessed different characteristics and that the characteristics of a species change over time. Darwin found support in Malthus's essay that noted a species always produces many more offspring than the food supply could support and that population size is kept in check by events such as starvation and disease. Darwin expanded this notion into a general struggle for survival in which only the fittest survive. According to Darwin, there are individual differences among offspring, with some offspring possessing traits that are conducive to survival, whereas others do not. Thus, there was a natural selection of those offspring whose traits are most conducive to survival under the existing circumstances.

Darwin demonstrated that the evolutionary process applies to humans as well as to other living organisms. Darwin defined fitness by the reproductive success of an individual. By changing the definition of fitness to mean an individual's ability to perpetuate copies of his or her *genes* into future generations, sociobiologists have been able to explain a vast array of human social behavior in terms of evolutionary theory. What was originally called sociobiology is now called evolutionary psychology.

Darwin's cousin Francis Galton had a passion for measurement. He equated intelligence with sensory acuity and therefore measured intelligence mainly by measuring the acuity of the senses. Because he believed that intelligence is inherited, he urged the practice of eugenics, or selective breeding, to improve human intelligence. Galton found great individual differences in the ability to experience mental images. Galton also observed that although there is a tendency for children to inherit the traits of their parents, there is also a regression toward the mean. For example, extremely tall parents tend to have tall children, but the children tend not to be as tall as the parents. By demonstrating how two things tended to vary together, Galton invented the method of correlation. It was Pearson who created the formula that quantified the magnitude of a correlation by generating a coefficient of correlation (*r*). Cattell brought Galton's notion of intelligence testing to the United States and was the first to employ the term *mental test*.

In France, Binet took another approach to testing, asserting that intelligence consists of several different mental abilities such as memory, imagery, attention, comprehension, and judgment. Binet's goal was to devise tests that would directly measure these mental abilities. In response to the French government's request for an instrument that could be used to reliably distinguish between normal children and children with mental deficiencies, Binet and Simon offered their 1905 scale of intelligence. In 1908 Binet and Simon revised their scale so that it not only would distinguish between normal and subnormal children but also would distinguish levels of intelligence among normal children. They gave the scale to children between the ages of 3 and 13, and all tests that 75% or more of the children of a certain age passed were assigned to that age. In this way, it became possible to determine whether any particular child was performing at, above, or below the average performance of other children of his or her age. In 1911 Binet and Simon again revised the scale so that five tests corresponded to each age level. This allowed one-fifth of a year to be added to a child's score for each test he or she passed beyond the average for his or her age group.

Stern offered the term *mental age* and also the notion of intelligence quotient. Intelligence quotient was calculated by dividing a child's mental age (score on the Binet–Simon scale) by the child's chronological age. It was Terman who later suggested that the quotient be multiplied by 100 to remove the decimal point and that "intelligence quotient" be abbreviated as *IQ*.

Binet believed that intelligence was not one mental faculty but many; he therefore opposed describing people's intelligence in terms of IQs. He also believed that, although intellectual potential may be inherited, most people function below their potential and could therefore benefit from education.

Spearman found high correlations among measures of sensory acuity and academic performance. Using a technique that came to be called factor analysis, Spearman concluded that intelligence consists of two factors. One factor (*s*) consists of specific abilities, and the other (*g*) consists of general intellectual ability. Furthermore, Spearman concluded that *g* is almost entirely inherited. Burt, a colleague of Spearman's, accepted Spearman's beliefs concerning *g* and suggested that education be stratified according to students' native intellectual ability. Burt was accused of falsifying his data, and a major scandal ensued.

Goddard translated the Binet–Simon scale into English and administered it to both children with mental retardation and to children in the New Jersey public schools. Appalled to find that many public school students performed at a level below their age norm, Goddard believed this poor performance reflected a deterioration in the nation's intelligence. To investigate the relationship between inheritance and intelligence, Goddard studied the family history of a girl with mental retardation. Goddard took his findings as support for the contention that intelligence is inherited. Many states instituted laws allowing for the sterilization of individuals with mental deficiencies as well as others who were socially undesirable. Fear of the "menace of the feeble-minded" directed attention to the immigrants entering the United States. Administration of the Binet–Simon test led to the conclusion that many immigrants had mental deficiencies, and they were deported back to Europe. The fact that poor test performance could have been due to educational, cultural, and personal experiences were initially considered by Goddard and rejected.

Terman revised the Binet–Simon scale, making it more compatible with U.S. culture and statistically easier to analyze. Terman's revision, called the Stanford–Binet, was used to isolate 1,528 intellectually gifted children who were then intensely studied throughout their lives. Through the years, it was found that members of this group of gifted individuals continued to score in the top 1% of the population in intelligence, participated in and excelled at a wide range of activities, and were outstanding academically. Because the study showed that the gifted children became well-adjusted, successful, healthy adults, it laid to rest the belief that gifted children were physically or psychologically handicapped as adults. Although Terman urged the use of mental tests to identify gifted children so that they could be groomed to be the future leaders of society, it was Leta Stetter Hollingworth who attempted to specify optimal educational experiences for the gifted. She also did much to improve the education of "subnormal" individuals. In addition, Hollingworth challenged many of the beliefs about women that were prevalent at the time—for example, the belief that women are intellectually inferior to men.

When the United States entered World War I, Yerkes and other psychologists developed an Army Alpha test for literate recruits and an Army Beta test for illiterate or non-English-speaking recruits. According to the results of the army's testing program, about half of the white males tested had a mental age of 13 or lower, and the situation was even worse for black males. Once again, proposals arose for restricting marriage and for widespread sterilization of individuals with mental deficiencies. At the time, however, a growing number of prominent individuals were wondering whether so-called intelligence tests actually measure genetically determined intelligence. They argued that test performance is determined more by education and personal experience than by inheritance.

In subsequent years, some U.S. psychologists revisited the idea that intelligence was best understood as one factor (Spearman's *g*). Several other American psychologists have made important contributions to psychometrics and statistics. For example, David Wechsler introduced a new system for determining IQ scores in his tests—the WAIS and WISC. When *The Bell Curve* was published in 1994, it reignited more or less the same controversy that surrounded the Burt "scandal." Once again, the issues seemed to be moral, political, or philosophical rather than scientific. Efforts to define intelligence and to determine how best to measure it continue in contemporary psychology. Today, most psychologists believe that both inheritance and experience are factors in intelligence. The argument now mainly concerns the relative contributions of each.

DISCUSSION QUESTIONS

1. Summarize Lamarck's theory of evolution.
2. Describe Spencer's social Darwinism and explain why it was so popular in the United States.
3. What is the Spencer–Bain principle?
4. Why did Darwin delay publication of his theory for so long? What finally prompted him to publish it?
5. Summarize Darwin's theory of evolution.
6. Compare Darwin's concept of fitness with the sociobiologists' concept of inclusive fitness. What are the implications of the difference between the two concepts for the explanation of human social behavior?
7. How did Galton support his argument that eugenics should be practiced?
8. Summarize Galton's contributions to psychology.
9. Describe Cattell's approach to intelligence testing and explain why that approach was eventually abandoned.
10. In what ways did Binet's approach to intelligence testing differ from Galton's and Cattell's?
11. Describe the 1905 Binet–Simon scale of intelligence. How was the scale revised in 1908? In 1911?
12. What procedure did Stern suggest for reporting a person's intelligence? Why did Binet oppose this procedure?
13. Summarize Spearman's views of intelligence.
14. What was the Burt "scandal"? In what way did it reflect the age-old controversy concerning nature versus nurture?
15. What conclusions did Goddard reach when he administered the Binet–Simon scale to schoolchildren in the United States?
16. What procedures did Goddard suggest for stopping the deterioration of intelligence in the United States? In suggesting these procedures, what assumption did he make?
17. Summarize the conclusions Goddard reached when he traced the ancestry of Deborah Kallikak.
18. In what important way did Terman modify the Binet–Simon scale?
19. What prompted Terman's longitudinal study of gifted individuals? Summarize the results of that study.
20. Summarize Leta Stetter Hollingworth's contributions to psychology.
21. How did Yerkes suggest that psychologists help in the war effort? What was the effort that resulted from this suggestion?
22. What arguments were offered in opposition to the contention that intelligence tests were measuring one, innate, factor of intelligence (*g*)?
23. In what way was the controversy surrounding the publication of *The Bell Curve* the same as that surrounding the Burt "scandal"?

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24. Describe some of the areas where U.S. psychologists have contributed to psychometrics.
25. Discuss the work of David Wechsler. What is the current status of intelligence tests?
26. Where do most psychologists today stand on the nature–nurture question as it applies to intelligence?

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GLOSSARY

Adaptive features Those features that an organism possesses that allow it to survive and reproduce.

Binet, Alfred (1857–1911) Found that following Galton's methods of measuring intelligence often resulted in falsely concluding that deaf and blind children had low intelligence. Binet attempted to measure directly the cognitive abilities he thought constituted intelligence.

Binet–Simon scale of intelligence The scale Binet and Simon devised to directly measure the various cognitive abilities they believed intelligence comprised. The scale first appeared in 1905 and was revised in 1908 and in 1911.

Burt, Cyril (1883–1971) Claimed that his studies of identical twins reared together and apart showed intelligence to be largely innate. Evidence suggested that Burt invented his data, and a major scandal ensued.

Cattell, James McKeen (1860–1944) Worked with Galton and developed a strong interest in measuring individual differences. Cattell brought Galton's methods of intelligence testing to the United States.

Coefficient of correlation (r) A mathematical expression indicating the magnitude of correlation between two variables.

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Correlation Systematic variation between two variables.

Darwin, Charles (1809–1882) Devised a theory of evolution that emphasized a struggle for survival that results in the natural selection of the most fit organisms. By showing the continuity between human and nonhuman animals, the importance of individual differences, and the importance of adaptive behavior, Darwin strongly influenced subsequent psychology.

Eugenics The use of selective breeding to increase the general intelligence of the population.

Evolutionary psychology A modern extension of Darwin's theory to the explanation of human and nonhuman social behavior (also called sociobiology).

Factor analysis A complex statistical technique that involves analyzing correlations among measurements and attempting to explain the observed correlations by postulating various influences (factors).

Fitness According to Darwin, an organism's ability to survive and reproduce.

Galton, Francis (1822–1911) Influenced by his cousin, Charles Darwin, was keenly interested in the measurement of individual differences. Galton was convinced that intellectual ability is inherited and therefore recommended eugenics, or the selective breeding of humans. He was the first to attempt to systematically measure intelligence, to use a questionnaire to gather data, to use a word-association test, to study mental imagery, to define and use the concepts of correlation and median, and to systematically study twins.

General intelligence (g) The aspect of intelligence that, according to Spearman, is largely inherited and coordinates specific intellectual abilities.

Goddard, Henry Herbert (1866–1957) Translated Binet's intelligence test into English and used it to test and classify students with mental retardation. Goddard was an extreme nativist who recommended that those with mental deficiencies be sterilized or institutionalized. As a result of Goddard's efforts, the number of immigrants allowed into the United States was greatly reduced.

Hollingworth, Leta Stetter (1886–1939) Rejected the belief, popular at the time, that women achieve less than males do because they are intellectually inferior to males; instead her explanation emphasized differences in social opportunity. Her career focused on improving the education of both subnormal and gifted students.

Inclusive fitness The type of fitness that involves the survival and perpetuation of copies of one's genes into subsequent generations. With this expanded definition of fitness, one can be fit by helping his or her kin survive and reproduce as well as by producing one's own offspring.

Inheritance of acquired characteristics Lamarck's contention that adaptive abilities developed during an organism's lifetime are passed on to the organism's offspring.

Intelligence quotient (IQ) Stern's suggested procedure for quantifying intelligence. The intelligence quotient is calculated by dividing mental age by chronological age.

Lamarck, Jean (1744–1829) Proposed that adaptive characteristics acquired during an organism's lifetime were inherited by that organism's offspring. This was the mechanism by which species were transformed. (*See also* Inheritance of acquired characteristics.)

Malthus, Thomas (1766–1834) Economist who wrote *Essay on the Principle of Population* (1798), which provided Darwin with the principle he needed to explain the observations that he had made while aboard the *Beagle*. The principle stated that because more individuals are born than environmental resources can support, there is a struggle for survival and only the fittest survive.

Mental age According to Stern, a composite score reflecting all the levels of the Binet–Simon test that a child could successfully pass.

Mental orthopedics The exercises that Binet suggested for enhancing determination, attention, and discipline. These procedures would prepare a child for formal education.

Natural selection A key concept in Darwin's theory of evolution. Because more members of a species are born than environmental resources can support, nature selects those with characteristics most conducive to survival under the circumstances, which allows them to reproduce.

Nature–nurture controversy The debate over the extent to which important attributes are inherited or learned.

Pearson, Karl (1857–1936) Devised the formula for calculating the coefficient of correlation.

Regression toward the mean The tendency for extremes to become less extreme in one's offspring.

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For example, the offspring of extremely tall parents tend not to be as tall as the parents.

Simon, Theodore (1873–1961) Collaborated with Binet to develop the first test designed to directly measure intelligence.

Social Darwinism Spencer's contention that, if given freedom to compete in society, the ablest individuals will succeed and the weaker ones will fail, and this is as it should be.

Sociobiology *See* Evolutionary psychology.

Spearman, Charles (1863–1945) Using an early form of factor analysis, found that intelligence comprised specific factors (*s*) and general intelligence (*g*). He believed the latter to be largely inherited. (See also **General intelligence**.)

Spencer, Herbert (1820–1903) First a follower of Lamarck and then of Darwin. Spencer applied Darwinian principles to society by saying that society should maintain a laissez-faire policy so that the ablest individuals could prevail. Spencer's position is called social Darwinism. (*See also* **Social Darwinism**.)

Spencer–Bain principle The observation first made by Bain and later by Spencer that behavior resulting in pleasurable consequences tends to be repeated and behavior resulting in painful consequences tends not to be.

Stern, William (1871–1938) Coined the term *mental age* and suggested the intelligence quotient as a way of quantifying intelligence. (*See also* **Intelligence quotient**.)

Struggle for survival The situation that arises when there are more offspring of a species than environmental resources can support.

Survival of the fittest The notion that, in a struggle for limited resources, those organisms with traits conducive to survival under the circumstances will live and reproduce.

Terman, Lewis Madison (1877–1956) Revised Binet's test of intelligence, making it more compatible with U.S. culture. Terman, along with Goddard and Yerkes, was instrumental in creating the Army Alpha and Army Beta tests. He also conducted a longitudinal study of gifted children and found that, contrary to the belief at the time, gifted children tended to become healthy, gifted adults.

Wallace, Alfred Russell (1823–1913) Developed a theory of evolution almost identical to Darwin's, at almost the same time that Darwin developed his theory.

Wechsler, David (1896–1981) Developed a new way of determining IQ scores, which is featured in his two tests—the WAIS (Wechsler Adult Intelligence Scale) and WISC (Wechsler Intelligence Scale for Children).

Yerkes, Robert M. (1876–1956) Suggested that psychology could help in the war effort (World War I) by creating tests that could be used to place recruits according to their abilities and to screen the mentally unfit from military service. The testing program was largely ineffective and was discontinued soon after the war.

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11

American Psychology and Functionalism

In Chapter 9, we considered the origins of academic psychology in Germany. Additionally, we saw that Titchener's brand of psychology in the United States, which he called structuralism, was essentially a psychology of pure consciousness with little concern for practical applications. In this chapter, we will look first at what psychology was like in America before Titchener and then at what psychology became when the doctrine of evolution combined with the U.S. Zeitgeist to create the first uniquely American school—functionalism.

EARLY U.S. PSYCHOLOGY

It is often assumed that U.S. psychology did not exist before Titchener and William James. In his presidential address to the Ninth International Congress of Psychology at Yale University in 1929, James McKeen Cattell said that a history of U.S. psychology before the 1880s "would be as short as a book on snakes in Ireland since the time of St. Patrick. Insofar as psychologists are concerned, America was then like heaven, for there was not a damned soul there" (1929, p. 12).

In making such a statement, Cattell assumed that only experimental psychology was *real* psychology and that everything else was mental or moral philosophy. Titchener agreed and argued forcibly that experimental psychology should be completely separated from philosophy and especially from theology. The problem with Cattell and Titchener's argument is that it ignored the fact that experimental psychology grew out of nonexperimental psychology; and therefore to understand the former, one must understand the latter.

In an attempt to set the record straight, J. W. Fay wrote *American Psychology Before William James* (1939), and A. A. Roback wrote *History of American Psychology* (1952), which traces U.S. psychology back to the colonial days. Also, Josef Brozek edited a book titled *Explorations in the History of Psychology in the United States* (1984). For our purposes, however, we will follow Sahakian's (1975) description of the four stages of early U.S. psychology, which begins circa 1640. There were of course Native Americans here well before that date, but we know very little about ideas they held with respect to psychology.

Stage One: Moral and Mental Philosophy (1640–1776)

Early in the period of moral and mental philosophy, to learn psychology was often to learn the accepted theology of the day. Like all other subjects taught at the time, psychology was combined with religious indoctrination. The earliest U.S. universities, such as Harvard (founded in 1636), were modeled after the British universities where it was common practice to perpetuate religious beliefs.

A period of "American Enlightenment" began in 1714, when John Locke's *An Essay Concerning Human Understanding* (1690) arrived in the colonies and had widespread influence. Samuel Johnson (1696–1772), the first president of Columbia University (founded in 1754), embraced Locke enthusiastically. As you should recall, Locke considered a number of topics clearly psychological in nature—for example, child psychology, the nature of consciousness, the nature of knowledge, and perception. Lockean philosophy provided the basis for a logic and a psychology that could be used to support one's religious beliefs. Roback says of this period, "Psychology existed for the sake of logic, and logic for the sake of God" (1952, p. 23).

Stage Two: Intellectual Philosophy (1776–1886)

During the stage of intellectual philosophy, psychology became a separate discipline in the United States, largely under the influence of Scottish commonsense philosophy. As we saw in Chapter 6, this Scottish school was a reaction against philosophers such as Hume, who maintained that nothing could be known with certainty and that moral and scientific laws were merely mental habits. Scottish philosophers such as Thomas Reid (1710–1796) disagreed, saying that sensory information could be accepted at face value (naive realism). The Scottish philosophers also maintained that self-examination yields valid information and that morality is based on self-evident intuitions. This commonsense philosophy had clear implications for theology: The existence and nature of God need not be proved logically because one's personal feelings could be trusted on these matters.

With the respectability of the senses and feelings established, textbooks written by the Scottish philosophers began to include such topics as perception, memory, imagination, association, attention, language, and thinking. Such a textbook was written by Dugald Stewart (1753–1828), titled *Elements of the Philosophy of the Human Mind* (1792), and was used at Yale University in 1824.

Soon U.S. textbooks bearing a close resemblance to those of the Scottish philosophers began to appear, such as Noah Porter's *The Human Intellect: With an Introduction Upon Psychology and the Soul* (1868). Porter's text represented a transitional period when psychology was leaving the realm of philosophy and becoming a separate discipline. Porter's book defined psychology as the science of the human soul and covered such topics as consciousness, sense perception, development of the intellect, association of ideas, memory, and reason.

Stage Three: The U.S. Renaissance (1886–1896)

As noted in the last chapter, Herbert Spencer's *Principles of Psychology* was used as a text at Harvard in the 1880s. In 1886, John Dewey (discussed later) published *Psychology*, which described the new empirical science. Also in 1887 came the *American Journal of Psychology*, the first psychology journal in the United States, and in 1890 William James's *The Principles of*

Psychology was published. All these events marked the beginning of a psychology that was to emphasize individual differences, adaptation to the environment, and practicality—in other words, a psychology that was compatible with evolution. Since the days of the pioneers, people in the United States emphasized individuality and practicality, and adaptation to the environment had to be a major concern. This explains why the United States was such fertile ground for physiognomy, phrenology, mesmerism, and spiritualism—practices that purported to help individuals live more effective lives.

It was also during this stage that Titchener began his structuralist program at Cornell University (1892), which successfully competed with functionalism for several years.

Stage Four: U.S. Functionalism (1896 and Beyond)

During the stage of U.S. functionalism, science, concern for practicality, emphasis on the individual, and evolutionary theory combined into the school of **functionalism**. Sahakian (1975) marks the beginning of functionalism at 1896, with the publication of John Dewey's article "The Reflex Arc in Psychology."

Titchener was at Cornell from 1892 to 1927, meaning that structuralism and functionalism overlapped. Members of the two schools were sometimes adversaries, and there was little constructive dialog between them. The schools nicely illustrate Kuhn's concept of paradigm because their assumptions, goals, and methodologies were distinctly different. For the structuralist, the assumptions concerning the mind were derived from British and French empiricism, the goal was to understand the structure of the mind, and the primary research tool was introspection. For the functionalist, the assumptions concerning the mind were derived from evolutionary theory; the goal was to understand how the mind and behavior work in aiding an organism's adjustment to the environment, and research tools included anything that was informative—be it introspection, the study of animal behavior, or the study of the mentally ill. In short, structuralism and functionalism were incommensurable.

CHARACTERISTICS OF FUNCTIONAL PSYCHOLOGY

Functionalism was never a well-defined school of thought with one recognized leader or a singular methodology. Amid functionalism's diversity, however, common themes ran through the work. Keller (1973) explains:

- The functionalists opposed what they considered the sterile search for the elements of consciousness in which the structuralists engaged.
- The functionalists wanted to understand the function of the mind rather than provide a static description of its contents. They believed that mental processes had a function—to aid the organism in adapting to the environment. That is, they were interested in the "is for" of the mind rather than the "is," its function rather than its structure.
- The functionalists wanted psychology to be a practical science, not a pure science, and they sought to apply their findings to the improvement of personal life, education, industry, and so on.
- The functionalists urged the broadening of psychology to include research on animals, children, and abnormal humans. They also accepted an eclectic methodology; from mazes to mental tests.
- The functionalists' interest in the "why" of mental processes and behavior led directly to a concern with motivation. Because an organism will act differently in the same environment as its needs change, these needs must be understood before the organism's behavior can be understood.
- The functionalists accepted *both* mental processes and behavior as legitimate subject matter for psychology, and most of them viewed introspection as one of many valid research tools.
- The functionalists tended to be more ideographic than nomothetic, that is, they were more interested in what made organisms

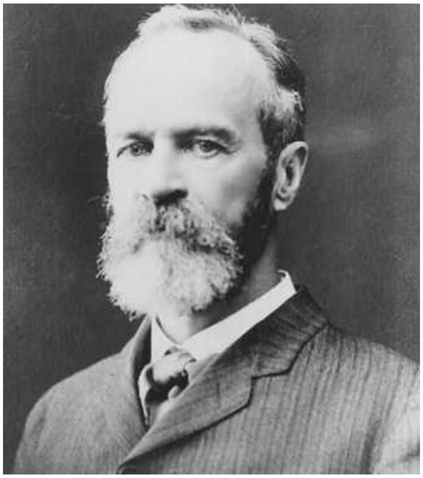
different from one another than what made them similar.

- All functionalists were directly or indirectly influenced by William James.

Before we review the thoughts of some members of the school of functionalism, we too must consider the foundation provided by William James.

WILLIAM JAMES

William James (1842–1910) represents a transition between European psychology and U.S. psychology. His purpose was never to suggest a school of thought, but his ideas contained the seeds that would grow into the school of functionalism. As mentioned, James had already brought prominence to U.S. psychology through the publication of *Principles* two years before Titchener arrived at Cornell. James was 25 years older than Titchener, and James died in 1910 when Titchener's influence was at its peak. James's psychology, however, became far more influential than Titchener's. In fact, soon after the publication of *Principles*, James began to compete with Wundt for the unofficial title of worldwide voice of psychology. In 1896, the Third International Congress of Psychology met in Munich. Wundt's laboratory was 17 years old, and he was 64. James's *Principles* was six years old, and he was 54. At the time, a Berlin newspaper referred to Wundt as "the psychological Pope of the Old World" and to James as "the psychological Pope of the New World" (Hilgard, 1987, p. 37). Although neither Wundt nor James attended the conference, the designation of "pope" indicated their status.



William James

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William James was born in New York City. His brother Henry, who would become a famous novelist, was born 15 months later. Their father, Henry James Sr., who had lost a leg in an adolescent accident, embraced the mystical Christian theology of Emanuel Swedenborg (1688–1772). So enchanted was the elder James that he wrote a book titled *The Secret of Swedenborg*. Henry James Sr. was independently wealthy and believed his children should receive the best possible education. After several private schools and tutors in the United States, the father decided that a European education would be even better; so William attended schools in Switzerland, France, Germany, and England. His early life was highly stimulating, involving a great deal of travel and exposure to intense intellectual discussions at home. In 1860, at 18 years of age and after showing a talent for painting, William decided on a career as an artist. However, his father was so distressed by this career choice that he moved the family away from William's art teacher and even threatened suicide if William persisted on this course (Fancher, 1990). Unfortunately for William, no career choice seemed to satisfy his father:

> Mr. James was not only critical of William's desire to paint, but when he followed his father's wishes and chose science, the elder James belittled that choice. Finally when William embraced metaphysics because his father praised philosophy as the most elevated intellectual pursuit, Henry maligned William for not adopting the proper kind. (Bjork, 1983, pp. 22–23)

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In 1861, James enrolled as a chemistry student at Harvard University. He soon switched to physiology to prepare himself for a career in medicine, and in 1864 (at the age of 22), he enrolled in Harvard's medical school. James's medical studies were interrupted when he accepted an invitation from Louis Agassiz (1807–1873), the famous Harvard biologist, to go on an expedition to Brazil. Seasick most of the time, James also came down with smallpox. Once he recovered, he decided to return to continue his medical studies, but after arriving back home, his health deteriorated, his eyesight became weak, and he experienced severe back pains. In 1867, James returned to Germany and bathed in mineral springs in hopes of improving his back problems. While in Germany, he began to read psychology and philosophy and attended lectures by Helmholtz and Du-Bois Reymond. In his diary, James shared a letter written to a friend in 1867, which shows that this was the time when James discovered Wundt and agreed with Wundt that it was time for psychology to become a science (James, 1920, Vol. 1, pp. 118–119).

James's Crisis

James returned to the United States and finally obtained his medical degree from Harvard in 1869 at the age of 27. After graduation, however, James's health deteriorated further, and he became deeply depressed. Apparently, one reason for his depression was the implications of materialistic physiology and psychology that had so impressed him. It was clear to James that if the materialism was correct, it applied to him as well. This meant that anything that happened to him was beyond his control. His depression, for example, was a matter of fate, and it made no sense to attempt to do anything about it. James's acceptance of Darwin's theory of evolution exacerbated the problem. In Darwin's view, there is variation, natural selection, and survival of the fittest; there is no freedom or choice.

A major turning point in James's life came when he read an essay on free will by Charles-Bernard Renouvier (1815–1903). After reading this essay, James (1920) wrote in his diary:

> I think that yesterday was a crisis in my life. I finished the first part of Renouvier's second "Essais" and see no reason why his definition of free will—"The sustaining of a thought because I choose to when I might have other thoughts"—need be the definition of an illusion. At any rate, I will assume for the present—until next year—that it is no illusion. My first act of free will shall be to believe in free will.… Hitherto, when I have felt like taking a free initiative, like daring to act originally, without carefully waiting for contemplation of the external world to determine all for me, suicide seemed the most manly form to put my daring into; now I will go a step further with my will, not only act with it, but believe as well; believe in my individual reality and creative power. (Vol. 1, pp. 147–148)

This change in beliefs improved James's depression, and he became highly productive. Here we also have the beginnings of James's **pragmatism**—the belief that if an idea works, it is valid. That is, the ultimate criterion for judging an idea should be the idea's usefulness or "cash-value." At this point, we also see the conflict James perceived between the objective, scientific viewpoint based on determinism and personal, subjective feelings, such as the feeling that one's will is free. James used pragmatism to solve the problem. While using the scientific method in psychology, he said, it was necessary to assume that human behavior is determined. As useful as this assumption was, however, it had limits. Certain metaphysical questions lay beyond the reach of science, and a subjective approach was more useful in dealing with them. Therefore, according to James, both a scientific *and* a philosophical approach must be used in the study of human behavior and thought. To assume that all aspects of humans could be known through scientific research, he said, was akin to a physician giving all his patients tics because it was the only thing he could cure. If something about humans—for example, free will—could not be studied effectively using a certain method, James said, one did not throw out that aspect of human existence. Rather, one sought alternative methods of investigation. In other words, for James, it was not proper for science to determine which aspects of human experience are worthy of investigation and which are not. James proposed a radical empiricism by which all consistently reported aspects of human experience are worthy of study. About James, Heidbreder (1933) said, "It was his opinion that nothing that presented itself as a possibility should be dismissed without a hearing" (p. 157). Following his own advice, as he often did, James explored the phenomenon of religious experience and summarized his findings in *The Varieties of Religious Experience* (1902), a volume that remains the standard text in psychology of religion courses even today.

In 1872, James was given the opportunity to teach physiology at Harvard, which he did for one year. He then toured Europe for a year before again returning to Harvard to teach, but this time his course concerned the relations between physiology and psychology. In 1875, James created a small demonstration laboratory, which he used in teaching his course. This has raised a controversy concerning who should be given credit for establishing psychology's first laboratory, Wundt in 1879 or James in 1875. Usually the credit is given to Wundt because his laboratory was more elaborate and was designed for research instead of merely for teaching demonstrations.

James retired from Harvard in 1907 and died of a heart condition at his country home near Mount Chocorua, New Hampshire, on August 26, 1910, resting peacefully in his wife's arms.

The Principles of Psychology

In 1878, publisher Henry Holt offered James a contract to write a textbook on psychology. The textbook was finally published 12 years later, in 1890, when James was 48 years old. Although James's *The Principles of Psychology* was to revolutionize psychology, James (1920) did not think much of it, as he indicated in a letter he sent to the publisher along with the manuscript:

> No one could be more disgusted than I at the sight of the book. No subject is worth being treated of in 1000 pages. Had I ten years more, I could rewrite it in 500; but as it stands it is this or nothing—a loathsome, distended, tumefied, bloated, dropsical mass, testifying to nothing but two facts: 1st, that there is no such thing as a science of psychology, and 2nd, that W. J. is an incapable. (Vol. 1, p. 294)

James's highly influential *Principles* appeared in two volumes, 28 chapters, and a total of 1,393 pages. Two years later, James published a condensed version of his *Principles* titled *Psychology: The Briefer Course* (1892/1985). *The Briefer Course* came to be called Jimmy, as the larger *Principles* was called James.

In James's writings we find treatment of a diverse array of topics, many of which later researchers pursued. As we will see, however, the themes of practicality (pragmatism) and individuality permeate most of his writings. Following his radical empiricism, James was always willing to entertain a wide variety of ideas ranging from religion, mysticism, faith healing, and psychic phenomena to the most rigorous scientific facts and methods available in psychology at the time.

The Spanish-born U.S. philosopher and poet, and James's Harvard colleague, George Santayana (1920) said of James,

> I think it would have depressed him if he had to confess that any important question was finally settled. He would still have hoped that something might turn up on the other side, and that, just as the scientific hangman was about to dispatch the poor convicted prisoner, an unexpected witness would ride up in hot haste, and prove him innocent. (p. 82)

Almost everything in *Principles* can be seen as a critical evaluation of what James perceived Wundt's approach to psychology to be. James (1890/1950) was especially harsh in the following passage:

> Within a few years what one may call a microscopic psychology has arisen in Germany, carried on by experimental methods, asking of course every moment

> for introspective data, but eliminating their uncertainty by operating on a large scale and taking statistical means. This method taxes patience to the utmost, and hardly could have arisen in a country whose natives could be *bored*. Such Germans as Weber, Fechner … and Wundt obviously cannot; and their success has brought into the field an array of younger experimental psychologists, bent on studying the *elements* of the mental life, dissecting them from the gross results in which they are embedded, and as far as possible reducing them to quantitative scales. The simple and open method of attack having done what it can, the method of patience, starving out, and harassing to death is tried; the Mind must submit to a regular *siege*, in which minute advantages gained night and day by the forces that hem her in must sum themselves up at last into her overthrow. There is little left of the grand style about these new prism, pendulum, and chronography-philosophers. They mean business, not chivalry. What generous divination, and that superiority in virtue which was thought by Cicero to give a man the best insight into nature, have failed to do, their spying and scraping, their deadly tenacity and almost diabolic cunning, will doubtless some day bring about. (Vol. 1, pp. 192–193)

James, of course, was responding to Wundt the experimentalist. If James had been able to probe deeper into Wundt's voluntarism and into his later *Völkerpsychologie*, he would have seen a remarkable similarity between himself and Wundt. In any case, it was Wundt the experimentalist who, after reading James's *Principles*, commented, "It is literature, it is beautiful, but it is not psychology" (Blumenthal, 1970, p. 238).

Although James appreciated Fechner's excursions into the supernatural (James wrote a sympathetic introduction to the English translation of Fechner's *The Little Book of Life After Death*), he did not think much of Fechner's scientific endeavors, which had so impressed Wundt (James, 1890/1950, Vol. 1, pp. 534, 549).

In many ways James was more closely aligned with the type of psychology seen in Stumpf. But within the *Principles* James tries to offer a fair consideration between the empirical and the rational, between the experimental and the phenomenological. This approach allowed critics anchored in those camps to find James inconsistent, but it also made the book an enduring classic. For more about James's ideas in the context of the *Principles*, see Blanshard and Schneider (1942), Donnelly (1992), Johnson and Henley (1990), or McLeod (1969).

Stream of Consciousness

With his concept of stream of consciousness, James opposed those who were busy searching for the *elements* of thought. In the first place, said James, *consciousness is personal*. It reflects the experiences of an individual, and therefore it is foolhardy to search for elements common to all minds. Second, *consciousness is continuous and cannot be divided up for analysis*:

> Let anyone try to cut a thought across in the middle and get a look at its section.… The rush of the thought is so headlong that it almost always brings us up at the conclusion before we can arrest it. Or if our purpose is nimble enough and we do arrest it, it ceases forthwith to be itself. As a snowflake crystal caught in the warm hand is no longer a crystal but a drop, so, instead of catching the feeling of relation moving to its term, we find we have caught some substantive thing, usually the last word we were pronouncing, statically taken, and with its function, tendency, and particular meaning in the sentence quite evaporated. The attempt at introspective analysis in these cases is in fact like seizing a spinning top to catch its motion, or trying to turn up the gas quickly enough to see how the darkness looks. (James, 1890/1950, Vol. 1, p. 244)

Third, *consciousness is constantly changing*. Even though consciousness is continuous and can be characterized as a steady stream from birth to death, it is also constantly changing. James quoted Heraclitus's aphorism about the impossibility of

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stepping into the same river twice. For James, the same is true for conscious experience. One can never have exactly the same idea twice because the stream of consciousness that provides the context for the idea is ever-changing.

Fourth, *consciousness is selective*. Some of the many events entering consciousness are selected for further consideration and others are inhibited. James (1890/1950) writes:

> We see that the mind is at every stage a theatre of simultaneous possibilities. Consciousness consists in the comparison of these with each other, the selection of some, and the suppression of the rest by the reinforcing and inhibiting agency of attention. (Vol. 1, p. 288)

Finally, and perhaps most important, *consciousness is functional*. This idea permeates all of James's writing, and it is the point from which the school of functionalism developed. According to James, the most important thing about consciousness—and the thing the elementists overlooked—is that its purpose is to aid the individual in adapting to the environment. Here we see the powerful influence of Darwin on early U.S. scientific psychology.

Consciousness, then, is personal, continuous, constantly changing, selective, and purposive. Very little in this is compatible with the view held by Wundt or the structuralists. James (1890/1950) reached the following famous conclusion concerning consciousness:

> Consciousness, then, does not appear to itself chopped up in bits. Such words as "chain" or "train" do not describe it fitly as it presents itself in the first instance. It is nothing jointed; it flows. A "river" or a "stream" are the metaphors by which it is most naturally described. *In talking of it hereafter, let us call it the stream of thought, of consciousness, or of subjective life.* (Vol. 1, p. 239)

Although James first mentioned **stream of consciousness** in his 1884 article "On Some Omissions of Introspective Psychology," Holland (1986) notes that George Henry Lewes used the term four years earlier in his *Problems of Life and Mind* (1880).

Habits and Instincts

James (1890/1950) believed that much animal and human behavior is governed by instinct:

> *Why do the various animals do what seem to us such strange things*, in the presence of such outlandish stimuli? Why does the hen, for example, submit herself to the tedium of incubating such a fearfully uninteresting set of objects as a nestful of eggs, unless she has some sort of a prophetic inkling of the result? The only answer is *ad hominem*. We can only interpret the instincts of brutes by what we know of instincts in ourselves. Why do men always lie down, when they can, on soft beds rather than on hard floors? Why do they sit around the stove on a cold day? Why, in a room, do they place themselves, ninety-nine times out of a hundred, with their faces towards the middle rather than to the wall? Why do they prefer saddle of mutton and champagne to hard-tack and ditch-water? Why does the maiden interest the youth so that everything about her seems more important and significant than anything else in the world? Nothing more can be said than that these are human ways, and that every creature *likes* its own ways, and takes to following them as a matter of course. (Vol. 2, pp. 386–387)

James did not believe that instinctive behavior is "blind and invariable." Rather, he believed that such behavior is modifiable by experience. Furthermore, he believed that new instinct-like patterns of behavior develop within the lifetime of the organism. James called these learned patterns of behavior **habits**.

According to James, habits are formed as an activity is repeated. Repetition causes the same neural pathways to, from, and within the brain to become more entrenched, making it easier for energy to pass through those pathways (see 1890/1950). Thus, James

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had a neurophysiological explanation of habit formation, and his account of learning was very close to Pavlov's (Chapter 12). Habits are functional because they simplify the movements required to achieve a result, increase the accuracy of behavior, reduce fatigue, and diminish the need to consciously attend to performed actions.

For James (1890/1950), then, it is habit that makes society possible:

> Habit … alone is what keeps us all within the bounds of ordinance, and saves the children of fortune from the envious uprisings of the poor. It alone prevents the hardest and most repulsive walks of life from being deserted by those brought up to tread therein.… It dooms us all to fight out the battle of life upon the lines of our nurture or our early choice, and to make the best of a pursuit that disagrees, because there is no other for which we are fitted, and it is too late to begin again. It keeps different social strata from mixing. Already at the age of twenty-five you see the professional mannerism settling down on the young commercial traveler, on the young doctor, on the young minister, on the young counsellor-at-law. You see the little lines of cleavage running through the character, the tricks of thought, the prejudices, the ways of the "shop," in a word, from which the man can by-and-by no more escape than his coat-sleeve can suddenly fall into a new set of folds. On the whole, it is best he should not escape. It is well for the world that in most of us, by the age of thirty, the character has set like plaster, and will never soften again. (Vol. 1, p. 121)

Through habit formation, we can make our nervous system our ally instead of our enemy:

> *For this we must make automatic and habitual, as early as possible, as many useful actions as we can*, and guard against the growing into ways that are likely to be disadvantageous to us, as we should guard against the plague. (James, 1892/1985, p. 11)

James (1892/1985) offered five maxims to follow in order to develop good habits and eliminate bad ones.

- Place yourself in circumstances that encourage good habits and discourage bad ones.
- Do not allow yourself to act contrary to a new habit that you are attempting to develop: "Each lapse is like the letting fall of a ball of string which one is carefully winding up; a single slip undoes more than a great many turns will wind again" (p. 12).
- Do not attempt to slowly develop a good habit or eliminate a bad one. Engage in positive habits completely to begin with and abstain completely from bad ones.
- It is not the *intention* to engage in good habits and avoid bad ones that is important; it is the actual doing so: "There is no more contemptible type of human character than that of the nerveless sentimentalist and dreamer, who spends his life in a weltering sea of sensibility and emotion, but who never does a manly concrete deed" (p. 15).
- Force yourself to act in ways that are beneficial to you, even if doing so at first is distasteful and requires considerable effort.

All of James's maxims converge on a fundamental principle: Act in ways that are compatible with the type of person you would like to become.

The Self

James (1892/1985) discussed what he called the **empirical self**, or the "me" of personality, which consists of everything that a person could call his or her own:

> *In its widest possible sense … a man's* Me [empirical self] *is the sum total of all that he* CAN *call his*, not only his body and his psychic powers, but his clothes, and his house, his wife and children, his ancestors and friends, his reputation and works, his lands and horses, and yacht, and bank-account. (p. 44)

James divided the empirical self into three components: the material self, the social self, and the spiritual self. The *material self* consists of everything material that a person could call his or her own, such as his or her own body, family, and property. The *social self* is the self as known by others. "*A man has as many social selves as there are individuals who recognize him* and carry an image of him in their mind" (1892/1985, p. 46). The *spiritual self* consists of a person's states of consciousness. It is everything we think and also includes the emotions associated with our various states of consciousness. The spiritual self, then, has to do with the experience of one's subjective reality.

The empirical self (the me) is the person as known by himself or herself, but there is also an aspect of self that does the knowing (the I). Thus, for James, the self is "partly known and partly knower, partly object and partly subject" (1892/1985, p. 43). James admitted that dealing with the "me" was much easier than dealing with the "I," or what he called "pure ego." James struggled with his concept of **self as knower** and admitted that it was similar to older philosophical and theological notions such as "soul," "spirit," and "transcendental ego."

Self-esteem. James was among the first to examine the circumstances under which people feel good or bad about themselves. He concluded that a person's **self-esteem** is determined by the ratio of things attempted to things achieved:

> With no attempt there can be no failure; with no failure, no humiliation. So our self-feeling in this world depends entirely on what we *back* ourselves to be and do. It is determined by the ratio of our actualities to our supposed potentialities; a fraction of which our pretensions are the denominator and the numerator our success: thus,
>
> $$\text{Self-esteem} = \frac{\text{Success}}{\text{Pretensions}}$$
>
> (James, 1892/1985, p. 54)

It should be noted that, according to James, one could increase self-esteem either by succeeding more *or* attempting less: "To give up pretensions is as blessed a relief as to get them gratified" (1892/1985, p. 54).

> There is the strangest lightness about the heart when one's nothingness in a particular line is once accepted in good faith. *All* is not bitterness in the lot of the lover sent away by the final inexorable "No." Many Bostonians … (and inhabitants of other cities, too, I fear), would be happier women and men today, if they could once for all abandon the notion of keeping up a Musical Self, and without shame let people hear them call a symphony a nuisance. How pleasant is the day when we give up striving to be young,—or slender! Thank God! we say, *those* illusions are gone. Everything added to the Self is a burden as well as a pride. A certain man who lost every penny during our civil war went and actually rolled in the dust, saying he had not felt so free and happy since he was born. (James, 1892/1985, p. 54)

Emotions

James reversed the traditional belief that emotion results from the perception of an event. For example, it was traditionally believed that if we see a bear, we are frightened and then we run. According to James, if we see a bear, we run, and *then* we are frightened. Perception, according to James, causes bodily reactions that are then experienced as emotions. In other words, the emotions we feel depend on what we do. James (1890/1950) put his theory as follows:

> Our natural way of thinking about … emotions is that the mental perception of some fact excites the mental affection called the emotion, and that this latter state of mind gives rise to the bodily expression. My theory, on the contrary, is that *the bodily changes follow directly the perception of the exciting fact, and that our feeling of the same changes as they occur IS the emotion.* Common-sense says, we

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> lose our fortune, are sorry and weep; we meet a bear, are frightened and run; we are insulted by a rival, are angry and strike. The hypothesis here to be defended says that this order of sequence is incorrect, that the one mental state is not immediately induced by the other, that the bodily manifestations must first be interposed between, and that the more rational statement is that we feel sorry because we cry, angry because we strike, afraid because we tremble, and not that we cry, strike, or tremble, because we are sorry, angry, or fearful, as the case may be. Without the bodily states following on the perception, the latter would be purely cognitive in form, pale, colorless, destitute of emotional warmth. We might then see a bear, and judge it best to run, receive the insult and deem it right to strike, but we should not actually *feel* afraid or angry. (Vol. 2, pp. 449–450)

Coupled with James's belief in free will, his theory of emotion yields practical advice: *Act the way you want to feel.* If we believe James, there is a great deal of truth in Oscar Hammerstein's lines, "Whenever I feel afraid, I … whistle a happy tune and … the happiness in the tune convinces me that I'm not afraid."

> Whistling to keep up courage is no mere figure of speech. On the other hand, sit all day in a moping posture, sigh, and reply to everything with a dismal voice, and your melancholy lingers. There is no more valuable precept in moral education than this, as all who have experience know: if we wish to conquer undesirable emotional tendencies in ourselves we must assiduously, and in the first instance cold-bloodedly, go through the *outward movements* of those contrary dispositions which we prefer to cultivate. The reward of persistency will infallibly come, in the fading out of the sullenness or depression, and the advent of real cheerfulness and kindliness in their stead. (James, 1890/1950, Vol. 2, p. 463)

James's theory of emotion provides still another example of the importance of the Zeitgeist; the Danish physician **Carl George Lange (1834–1900)** published virtually the same theory at about the same time. In recognition of the contributions of both men, the theory is now known as the **James–Lange theory of emotion**. Almost immediately after this theory was presented, it was harshly criticized by such individuals as Wilhelm Wundt and Walter B. Cannon (1871–1945). For a review of these and other criticisms, see Finger (1994). However, subsequent research has often favored James and Lange (e.g., Schachter & Singer, 1962; Zillman, Katcher, & Milavsky, 1972).

Free Will

Although James did not solve the matter of free will, he did arrive at a position with which he was comfortable. He noted that without the assumption of determinism, science would be impossible, and insofar as psychology was to be a science, it too must assume determinism. Science, however, is not everything, and for certain approaches to the study of humans, the assumption of free will might be very fruitful:

> Science … must constantly be reminded that her purposes are not the only purposes, and that the order of uniform causation which she has use for, and is therefore right in postulating, may be enveloped in a wider order, on which she has no claims at all. (James, 1890/1950, Vol. 2, p. 576)

James's Analysis of Voluntary Behavior. According to James's **ideo-motor theory of behavior**, an idea of a certain action causes that action to occur. He believed that in the vast majority of cases, ideas of actions flowed immediately and automatically (habitually or reflexively) into behavior. This automatic process continues unless mental effort is expended to purposively select and hold an idea of interest in consciousness. For James, voluntary action and mental effort were inseparable. The ideas of various behavioral possibilities are retained from previous experience, and

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their recollection is a prerequisite to voluntary behavior: "A supply of the various movements that are possible, left in the memory by experiences of their involuntary performance, is thus the prerequisite of the voluntary life" (James, 1892/1985, p. 283). From the ideas of various possible actions, one is selected for attention, and that is the one that causes behavior and continues to do so as long as the idea is attended to. Therefore, "what holds attention determines action" (James, 1892/1985, p. 315). The will functions, then, by selecting one from among many ideas of action we are interested in doing. By fiat, the will expends energy to hold the idea of interest in consciousness, thus inhibiting other ideas: "Effort of attention is thus the essential phenomenon of will" (James, 1892/1985, p. 317). It is by controlling our ideas of behavior that we control our actual behavior. Because ideas cause behavior, it is important to attend to those ideas that result in behavior deemed desirable under the circumstances: "The terminus of the psychological process in volition, the point to which the will is directly applied, is always an idea" (James, 1892/1985, p. 322). So if we combine James's theories of volition and emotion, what we think determines what we do, and what we do determines how we feel.

James believed that bodily events cause thoughts and that thoughts cause behavior. Thus, on the mind-body question, he was an interactionist. Exactly how the mind and body interacted was not known to James and, to him, the nature of the interaction may never be known. He said, "Nature in her unfathomable designs has mixed us of clay and flame, of brain and mind, that the two things hang indubitably together and determine each other's being, but how or why, no mortal may ever know" (1890/1950, Vol. 1, p. 182).

Pragmatism

Everywhere in James's writing is his belief in pragmatism. According to pragmatism, which is a cornerstone of functionalism, any belief, thought, or behavior must be judged by its consequences. Any belief that helps create a more effective and satisfying life is worth holding, whether such a belief is scientific or religious. Believing in free will was emotionally satisfying to James, so he believed in it. According to the pragmatic viewpoint, truth is not something "out there" in a static form waiting to be discovered, as many of the rationalists maintained. Instead, truth is something that must be gauged by effectiveness under changing circumstances. What works is true, and because circumstances change, truth must be forever dynamic.

There is a kinship between Vaihinger's philosophy of "as if" (see Chapter 9) and James's pragmatism. Both insisted that words and concepts be judged by their practical consequences. For both, arriving at concepts such as God, free will, matter, reason, the Absolute, and energy was not the end of a search for knowledge but a beginning. The practical consequences of such concepts must be determined:

> If you follow the pragmatic method, you cannot look on any such word as closing your quest. You must bring out of each word its practical cash-value, set it at work within the stream of your experience. It appears less as a solution, then, than as a program for more work. (James, 1907/1981, p. 28)

James's pragmatic philosophy appears in his description of the methods that psychology should employ. He urged the use of both introspection and experimentation, as well as the study of animals, children, preliterate humans, and abnormal humans. In short, he encouraged the use of any method that would shed light on the complexities of human existence; he believed that nothing useful should be omitted.

In 1907, James published *Pragmatism* (dedicated to the memory of John Stuart Mill), in which he delineated two types of personality: the *tender-minded* and the *tough-minded*. Tender-minded people are rationalistic (principle-oriented), intellectual, idealistic, optimistic, religious, and dogmatic, and they believe in free will. Conversely, tough-minded people are empiricistic (fact-oriented), sensationalistic, materialistic, pessimistic, irreligious, skeptical, and fatalistic. James viewed pragmatism as a way of compromising between the two worldviews. The pragmatist simply takes from each list whatever works best in the circumstances at hand.

Again, the criterion of the validity of an idea, according to the pragmatist, is its usefulness. No idea, no method, no philosophy, no religion should be accepted or rejected except on the basis of usefulness:

> Rationalism sticks to logic and the empyrean [lofty, abstract]. Empiricism sticks to the external senses. Pragmatism is willing to take anything, to follow either logic or the senses and to count the humblest and most personal experiences. She will count mystical experiences if they have practical consequences. She will take a God who lives in the very dirt of private fact—if that should seem a likely place to find him.
>
> Her only test of probable truth is what works best in the way of leading us, what fits every part of life best and combines with the collectivity of experience's demands, nothing being omitted. If theological ideas should do this, if the notion of God, in particular, should prove to do it, how could pragmatism possibly deny God's existence? She could see no meaning in treating as "not true" a notion that was pragmatically so successful. (James, 1907/1981, pp. 38–39)

Following his belief that any idea has potential pragmatic value, James enthusiastically embraced parapsychology and in 1884 was a founder of the American Society for Psychical Research. For an interesting survey of James's thoughts on parapsychology, religion, and faith healing, see Murphy and Ballou (1960/1973).

James's Contributions to Psychology

James helped incorporate evolutionary theory into psychology. By stressing what is useful, he represented a major departure from the pure psychology of both voluntarism and structuralism. For James, as well as for the functionalists who followed him, usefulness defined both truth and value. James expanded research techniques in psychology by not only accepting introspection but also encouraging any technique that promised to yield useful information about people. By studying all aspects of human existence—including behavior, cognition, emotions, volition, and even religious experience—James also expanded the subject matter of psychology. As we will see in Chapter 20, James's eclectism is very much in accordance with postmodernism.

James's students at Harvard included many we will see in this chapter—Angell, Calkins, Hall, Santayana, Thorndike, and Woodworth. Others were author Gertrude Stein and cofounder of the National Association for the Advancement of Colored People, W. E. B. Du Bois. James's ideas are not only considered foundational for functional psychology and pragmatic philosophy, but can be seen in behaviorism, cognitive science, and existential-phenomenological psychology (Henley, 2007), as well as clinical psychology (Howard, 1992). Numerous biographies exist (e.g., Angell, 1911; Myers, 1986; Perry, 1935; Simon, 1998; Starbuck, 1943; Townsend, 1996), all of which highlight not only his intellect, his gift as a writer, but also his kindness and impish sense of humor.

In 1892, when James was 50, he decided to devote his attention back to philosophical matters, something that necessitated relinquishing the directorship of the Harvard Psychology Laboratory. To maintain the laboratory's reputation as the best in the country, James sought an outstanding, creative, experimentally oriented psychologist, and certainly one who did not just parrot Wundtian psychology (at least as James understood it). He found such a person in Hugo Münsterberg.

HUGO MÜNSTERBERG

Born in the east Prussian port city of Danzig (now Gdansk, Poland), **Hugo Münsterberg (1863–1916)** was one of four sons of prominent parents. His father was a successful businessman, his mother a recognized artist and musician. Both his mother and father died before he was 20 years old.

Hugo Münsterberg

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Throughout his life, Münsterberg had wide-ranging interests. In his early years, he displayed talent in art, literature, poetry, foreign languages, music, and acting. Then, while studying at the University of Leipzig, he heard a lecture by Wundt and became interested in psychology. Münsterberg eventually became Wundt's research assistant and received his doctorate under Wundt's supervision in 1885, at age 22. Perhaps on Wundt's advice, Münsterberg next studied medicine at the University of Heidelberg and receiving his medical degree in 1887. That same year, he began teaching at the University of Freiburg, where he started a psychology laboratory and began publishing papers on time perception, attentional processes, learning, and memory.

During the time when he was Wundt's assistant, one of Münsterberg's jobs was to study voluntary activities through introspection. The two men disagreed, however, over whether the will could be experienced as a conscious element of the mind during introspection. Wundt believed that it could, whereas Münsterberg believed that it could not. In fact, Münsterberg did not believe that will was involved in voluntary behavior at all. For him, as we prepare to act one way or another, we consciously experience this bodily preparedness and confuse it with the will to act. For Münsterberg then, what we experience consciously as will is an epiphenomenon, a by-product of bodily activity. This idea, of course, was diametrically opposed to Wundt's interpretation of voluntary behavior. For Wundt, volitional behavior is always preceded by a conscious will to act. Although James would never have removed consciousness as a causal element in his analysis of voluntary (willful) behavior, he did see in Münsterberg's position some support for his ideo-motor theory of behavior. If nothing else, both analyses noted a close, direct relationship between thoughts and behavior. However, the relationships postulated were converse. For James ideas cause behavior; for Münsterberg behavior causes ideas. In fact, there was a closer correspondence between James's theory of emotion and Münsterberg's analysis of voluntary behavior. As we have seen, the James–Lange theory of emotion states that consciously experienced emotions are by-products of bodily reactions elicited by a situation. For Münsterberg the feeling of willful action results from an awareness of covert behavior, or a readiness to act overtly, elicited by a situation. In both cases (emotion for James, the feeling of volition for Münsterberg), conscious experience is a by-product (epiphenomenon) of behavior. In the case of volition, James's analysis was much closer to Wundt's than it was to Münsterberg's. In any case, in 1888, Münsterberg elaborated his theory in *Voluntary Action*, a book that James called a masterpiece and Wundt criticized harshly. James was impressed by many of Münsterberg's publications and cited them often in his *Principles*. He arranged to meet Münsterberg in Paris at the first International Congress of Psychology in 1889, and their relationship strengthened further.

After completing *Principles*, James wanted very much to leave psychology, especially experimental psychology, so that he could more actively pursue his interests in philosophy. To make the change, James needed someone to replace him as director of the Harvard Psychology Laboratory. In 1892 (the same year that Titchener arrived at Cornell), James offered Münsterberg the job despite the fact that Münsterberg could read but not speak English. Münsterberg accepted and learned to

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speak English so well and so quickly that his classes were soon attracting many students. Although he adjusted well, Münsterberg could not decide whether he wanted to give up his homeland (Germany) in favor of a lifelong commitment in the United States. In 1895, he asked for and received a leave of absence so that he could return to the University of Freiburg. After two years, he was unable to obtain the type of academic appointment that he sought. He wrote to James in 1897, once again accepting the position at Harvard. However, Münsterberg never severed his emotional ties with his homeland.

For several years, Münsterberg did extremely well at Harvard. In 1898, he was elected president of the American Psychological Association (APA) and became chair of the Division of Philosophy at Harvard, which at the time still included psychology. When in 1900 he published *Basics of Psychology*, he dedicated it to James. As time went on, however, James's pragmatic attitude toward philosophy and psychology began to irritate Münsterberg, who had a more positivistic approach to science. He was especially appalled by James's acceptance of psychoanalysis and religious phenomena into the realm of psychology. For Münsterberg, "Mysticism and mediums were one thing, psychology was quite another. Experimental psychology and psychic hocus-pocus did not mix" (Bjork, 1983, pp. 63–64). More and more, however, Münsterberg's interests turned to the practical applications of psychological principles. Münsterberg felt *very* strongly that psychologists should attempt to uncover information that could be used in the real world. With his efforts, Münsterberg did much to create what is now referred to as **applied psychology**.

Münsterberg's Applied Psychology

In an attempt to understand the causes of abnormal behavior, Münsterberg saw many mentally ill people. Because he was seeing them for scientific reasons, he never charged them a fee. He applied his "treatment," which consisted mainly of causing his patients to expect to improve, to cases of alcoholism, drug addiction, phobia, and sexual dysfunction, but not to psychosis. He felt that psychosis was caused by deterioration of the nervous system and could not be treated. Along with the suggestion that individuals would improve as the result of his efforts, Münsterberg also employed **reciprocal antagonism**, which involved strengthening the thoughts opposite to those causing problems. Although Münsterberg was aware of Freud's work, he chose to treat symptoms directly and did not search for the underlying causes of those symptoms. Münsterberg said of Freud's theory of unconscious motivation, "The story of the subconscious mind can be told in three words: there is none" (1909, p. 125).

Forensic Psychology. Münsterberg was the first to apply psychological principles to legal matters, thus creating **forensic psychology**. Among other things, he pointed out that eyewitness testimony could be unreliable because sensory impressions could be illusory, suggestion and stress could affect perception, and memory is not always accurate. Münsterberg would often stage traumatic events in his classroom to show that even when witnesses were attempting to be accurate, there were wide differences in the individual accounts of what had actually happened. Münsterberg urged that psychological methods replace the brutal interrogation of criminals. He believed that harsh interrogation could result in false confessions because some people want to please the interrogators, some need to give in to authority figures, and some very depressed people may feel a need to be punished. Münsterberg published his thoughts on forensic psychology in his best-selling book *On the Witness Stand* (1908). In this book, he described an apparatus that could detect lying by observing changes such as those in pulse rate and respiration. Others would follow Münsterberg's lead and later create the "lie detector."

Industrial Psychology. Münsterberg's *Vocation and Learning* (1912) and *Psychology and Industrial Efficiency* (1913) are usually considered the beginning of what later came to be called **industrial psychology**. In these books, Münsterberg dealt with such topics as methods of personnel selection, methods of increasing work efficiency, and marketing and advertising techniques. To aid in personnel selection, for example, he recommended defining the skills necessary for performing a task and then determining the person's ability to perform that task. In this way, one could learn whether a person had the skills necessary for doing a certain job adequately. Münsterberg also found that whether a task is boring could not be determined by observing the work of others. Often, work that some people consider boring is interesting to those doing it. It is necessary, then, to take individual differences into account when selecting personnel and when making job assignments.

Münsterberg's Fate

Because of his work in applied psychology, Münsterberg was well known to the public, the academic world, and the scientific community, serving in 1898 as the seventh president of the APA. William James had made psychology popular within the academic world, but Münsterberg helped make it popular with the general public by showing its practical uses. In addition, Münsterberg had among his personal friends some of the most influential people in the world, including Presidents Theodore Roosevelt and William Howard Taft and the Nobel prize–winning philosopher Bertrand Russell. He was invited to dine at the White House, and in his home in Cambridge, Massachusetts, he and his wife often hosted European scholars and German royalty. In addition, he was awarded several medals by the German government. By the time Münsterberg died in 1916, however, the general attitude toward him had turned negative, and his death went essentially unnoticed. The main reason for his unpopularity was his desire to create a favorable relationship between the United States and his native Germany. Never obtaining U.S. citizenship, Münsterberg maintained a nationalistic loyalty toward Germany. He believed that both Germans and Americans had inaccurate stereotypes of each other, and he wrote books attempting to correct them—for example, *The Americans* (1904). In another book, *American Problems* (1910), Münsterberg was highly critical of Americans, saying that they had a general inability to concentrate their attention on any one thing for very long. He explained this national inability to attend by the fact that, in the United States, women were influential in forming intellectual and cultural development. The intellectual vulnerability of women also explained the popularity of psychological fads such as seances. While James was attempting to discover if any of the claims of "mediums" were valid, Münsterberg was busy exposing them as dangerous frauds.

As World War I approached, Münsterberg found himself caught up in the U.S. outrage over German military aggression. He was suspected of being a spy, many of his colleagues at Harvard disassociated themselves from him, and there were threats against his life. Perhaps because of all the stress, Münsterberg died on December 16, 1916, from a cerebral hemorrhage just as he began a lecture; he was only 53 years old. For an interesting account of Münsterberg's rise to fame and his decline into disfavor, see Spillmann and Spillmann (1993).

Harvard sought Titchener as a replacement for Münsterberg, but Titchener refused the offer. James McKeen Cattell applied for the position, but his application was denied. The position was finally filled by William McDougall, whom we mentioned in the last chapter and will cover in the next.

Mary Whiton Calkins

When Münsterberg took over James's psychology laboratory, he also became supervisor of the psychology graduate students, and it was he who directed their dissertation research. One of those graduate students was **Mary Whiton Calkins (1863–1930)**. Calkins was the oldest of five children. She grew up in Buffalo, New York, where her father, Wolcott Calkins, was a Protestant minister. In 1881, the family moved to Newton, Massachusetts, where the reverend accepted a pastorate. After completing high school in Newton, Calkins attended Smith College and graduated in 1885. Shortly after her graduation, Calkins accompanied her family on a yearlong vacation in Europe. Upon their return, Calkins was offered a position at Wellesley College teaching

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Mary Whiton Calkins

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Greek. This began Calkins's more than 40-year affiliation with Wellesley.

After Calkins had taught for about a year at Wellesley, college officials sought a woman to teach experimental psychology. Because no woman was available for the job, Wellesley officials decided to arrange for the training of one. Calkins was designated as that person because of her success as a teacher and her interest in philosophy. The appointment was made with the understanding that Calkins would study experimental psychology for a year. This posed a problem because none of the nearby institutions accepted female graduate students at the time. In 1890, Calkins contacted Josiah Royce and William James at Harvard, seeking permission to attend their seminars. Royce served as APA president in 1901, but was primarily a philosopher.

Both Royce and James said yes, but Charles W. Eliot, Harvard's president, said no. After intense lobbying by Royce, James, and Calkins's father, Eliot reversed his position and allowed Calkins to attend graduate seminars. He stipulated, however, that she attend without being officially enrolled as a Harvard student. Eliot was concerned that Calkins's official enrollment would open the door to coeducation at Harvard, which he strongly opposed. When it became known that Calkins would be attending James's seminar, the male students promptly withdrew, presumably in protest. This left Calkins alone in the seminar with James to discuss his just-published *Principles*. Calkins (1930) described her experience:

> I began the serious study of psychology with William James. Most unhappily for them and most fortunately for me the other members of his seminary in psychology dropped away in the early weeks of the fall of 1890; and James and I were left … at either side of a library fire. *The Principles of Psychology* was warm from the press; and my absorbed study of those brilliant, erudite, and provocative volumes, as interpreted by their writer, was my introduction to psychology. (p. 31)

While Calkins was attending seminars at Harvard, she was also doing laboratory work at Clark University under the supervision of Edmund C. Sanford, who we previously noted as Terman's (Chapter 10) advisor. This too was by special arrangement. Her research on dreams, under Sanford's supervision, was presented at the first annual APA meeting in December 1892 and published in 1893. Calkins also published a paper on the association of ideas, stimulated by James's seminar, in 1892.

In the fall of 1891, Calkins returned to Wellesley, where she established a psychology laboratory and introduced experimental psychology into the curriculum. After about a year, Calkins felt the need to continue her formal education, so she returned to Harvard, again as a nonregistered student. By now James had moved on to philosophy on a full-time basis, and Münsterberg had taken over the psychology laboratory. For the first year and a half, while working with Münsterberg, Calkins continued to teach at Wellesley. Then, in the academic year of 1894–1895, she took an academic leave to devote herself full-time to laboratory work with Münsterberg. Calkins, who was two months older than Münsterberg, got along very well with him; the fact that Calkins was fluent in German probably helped. Münsterberg remained Calkins's mentor and advocate for many years. Strangely, Calkins and Münsterberg shared the same view of professional women. Both believed

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that the primary female roles were mother and wife. Calkins "pitied" and "condemned" women who declined marriage to pursue a career, although Calkins never married. She also disavowed feminism, believing that it was incompatible with family values: "Wherein feminism makes encroachments into the institution of the family, I cannot follow it" (Scarborough & Furumoto, 1987, p. 43). Münsterberg agreed, except for the cases of a few exceptional women who should pursue careers instead of motherhood. Clearly, Calkins was seen as such an exception.

While working in Münsterberg's laboratory, Calkins did original research on the factors influencing memory. During this research, Calkins invented the still widely used **paired-associate technique** to study the influence of frequency, recency, and vividness on memory. For example, Calkins showed her subjects a series of colors paired with numbers. Later, after several paired presentations, the colors alone were presented and the subjects were asked to recall the corresponding numbers. Among other things, Calkins found that frequency of occurrence facilitated memory more than recency or vividness did. In addition to her work on paired-associate learning, Calkins did pioneering research on short-term memory (Madigan & O'Hara, 1992).

So impressed was Münsterberg that he described Calkins as the most qualified student he had supervised at Harvard, and he urged Harvard officials to accept her as a doctoral candidate. His request was considered and rejected. In April 1895, Calkins requested and was given an unofficial PhD examination, which she passed with high honors. James, who was a member of her examining committee, described her performance as the best he had ever seen at Harvard. In James's opinion, Calkins's performance exceeded even that of George Santayana, who until then had the reputation of having had the most outstanding performance on a Harvard PhD examination. Still, Harvard refused to grant Calkins a doctorate because she was a woman.

In 1894, Harvard created Radcliffe College as a degree-granting women's college. Radcliffe offered no graduate courses or seminars, and it had no laboratories. Those students officially enrolled at Radcliffe actually did all of their graduate work and research at Harvard. In April 1902, the governing board at Radcliffe voted to grant Calkins a PhD even though she had never been enrolled there. Münsterberg encouraged her to accept, but she refused.

After her unofficial PhD examination at Harvard, Calkins returned to Wellesley in the fall of 1895 as an associate professor. In 1898, she was promoted to full professor. Although trained in mainstream experimental psychology at Harvard and Clark, Calkins soon came to dislike the cold, impersonal nature of such psychology. Her attention shifted to self-psychology, showing the influence of James. According to Heidbreder (1972), Calkins came to see "the classical experimental psychologists as out of touch … with important portions of … [the] subject matter [of psychology] as it presents itself in ordinary experience as she herself observed it and as she believed, by checking with others, that they too observed it" (p. 63). Calkins (1930) lamented that psychology, in its effort to rid itself of metaphysical speculation, had essentially dismissed the concept of self as unnecessary:

> Modern psychology has quite correctly rid itself of the metaphysicians' self—the self often inferred to be free, responsible, and [immortal]—and has thereupon naively supposed that it has thus cut itself off from the self. But the self of psychology has no one of these inferred characters: it is the self, immediately experienced, directly realized, in recognition, in sympathy, in vanity, in assertiveness, and indeed in all experiencing. (p. 54)

Furumoto (1991) speculates that it was Calkins's life circumstances that created her intense interest in self-psychology:

> It should come as no great surprise … that the alternative to the classical experimental view espoused by Calkins concerned itself with something of the utmost significance to her and to the other women with whom she shared her Wellesley world, namely the reality and importance of selves in everyday experience. (p. 70)

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Wentworth (1999) argues that Calkins's interest in self-psychology reflected her deep religious convictions:

> Her personal and intellectual lives seem to have been bonded together by what I have come to think of as a distinctly moral paste composed of an interest not in the study of selves in isolation but in the study of selves living in knowledge of their interconnectedness to other human beings, to a divine being, or to both. (p. 128)

Calkins continued to promote self-psychology even in the heyday of behaviorism, when the topic of self-psychology was essentially taboo. Her tenacity finally resulted in the creation of a U.S. brand of personality theory featuring the concept of self. According to Woodward (1984), there were two pioneers of personality theory in the United States—Calkins and Gordon Allport—and Calkins was first.

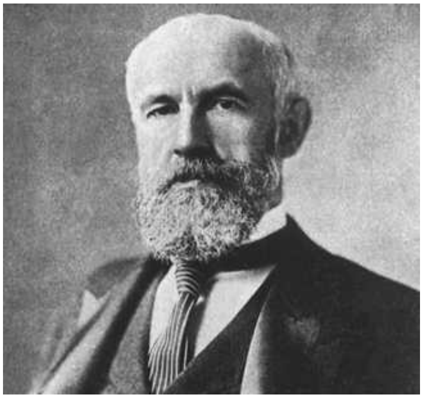
Calkins remained at Wellesley until her retirement in 1929. During her academic career, she published four books and over a hundred journal articles. Also, it was Calkins, again demonstrating her facility with foreign languages, who translated La Mettrie's *L'Homme Machine* (*Man a Machine*) into English. Her major contribution to psychology was her version of self-psychology, which she developed over a period of 30 years. So significant were her contributions that even without an advanced degree, she was elected the first female president of the APA (1905). She was also the first female president of the American Philosophical Association (1918). She was granted honorary degrees by Columbia (1909) and by her alma mater, Smith (1910). In 1928, she was given honorary membership in the British Psychological Association. Calkins died in 1930 at the age of 67. For more interesting biographical information, see Furumoto (1991) or Scarborough and Furumoto (1987).

GRANVILLE STANLEY HALL

In his influence on U.S. psychology, **Granville Stanley Hall (1844–1924)** was second only to William James. As we will see, Hall was a theorist, but above all he was an organizer. The number of firsts associated with Hall is unequaled by any other U.S. psychologist.

Hall was born on the first of February in the small farming town of Ashfield, Massachusetts. In 1863, he enrolled in Williams College, where he learned associationism, Scottish commonsense philosophy, and evolutionary theory as he prepared for the ministry. Upon graduation in 1867, he enrolled in the Union Theological Seminary in New York City. There, Hall gave indications that perhaps he was not cut out for the clergy:

> During his year in New York, he explored the city with zest, roaming the streets, visiting police courts, and attending churches of all denominations. He joined a discussion club interested in the study of positivism, visited the theater for plays and musicals, tutored young ladies from the elite of New York, visited a phrenologist, and generally had an exciting year. He was not noted for his religious orthodoxy. After preaching his trial sermon before the faculty and students, he went to the office of the president for criticism. Instead of discussing his sermon, the president knelt and prayed that Hall would be shown the errors of his ways. (R. I. Watson, 1978, p. 398)



Granville Stanley Hall

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In 1868, a small grant made it possible for Hall to travel to Germany, where he studied theology and philosophy. He also spent much time in beer gardens and theaters and engaged in considerable romance.

In 1871, Hall accepted a position at Antioch College in Ohio, where he not only taught English literature, French, German, and philosophy but also served as the librarian, led the choir, and did a little preaching. While at Antioch, Hall read Wundt's *Principles of Physiological Psychology*. In 1876, he was offered an instructorship of English at Harvard. During his stay at Harvard, Hall became friends with William James, who was only two years his elder. Hall did research in Harvard's medical school, writing up his results as "The Muscular Perception of Space," which he offered as his doctoral thesis in 1878. This was the first psychological dissertation in America. After receiving his doctorate, Hall returned to Germany, where he studied with Wundt, du Bois-Reymond, and Helmholtz. Hall was Wundt's first student from the United States. In a letter to James, Hall confessed that he had learned more from Helmholtz than from Wundt.

In 1880, at the age of 36, Hall returned to the United States, where after giving a series of lectures, he accepted a position at Johns Hopkins University. In 1883, Hall set up a working psychology laboratory. It is generally agreed that Wundt founded the world's first psychology laboratory, in Leipzig in 1879, and that Hall's laboratory at Johns Hopkins was the first psychology laboratory in the United States (Boring, 1965; as previously mentioned, the laboratory James established in 1875 is generally discounted because it was designed for teaching demonstrations rather than for research). While at Johns Hopkins, besides founding a psychology laboratory, Hall founded the first U.S. journal dedicated to psychological issues, the *American Journal of Psychology*, which initially appeared in 1887. Also while at Johns Hopkins, Hall taught James McKeen Cattell and John Dewey, who were later to become key figures in functionalism, and Arnold Gesell, who became a highly influential pediatrician.

Polish born Joseph Jastrow (1863–1944) had worked on psychological topics with the famous philosopher C. S. Pierce before he was dismissed from Hopkins. Following Pierce's departure, Jastrow completed his dissertation under Hall. Perhaps best known for the widely used "Duck-Rabbit" image that illustrates the Gestalt principle of figure and ground (Chapter 14), he was the founder of the psychology program at the University of Wisconsin, and APA's president in 1900. Also among Hall's students at Hopkins was Thomas Woodrow Wilson (1856–1924), who went on to become the 28th president of the United States. Under Hall's influence, Wilson actually pondered giving up his study of politics and history and majoring in psychology instead (Pruette, 1926).

President of Clark University

In 1888, Hall left Johns Hopkins to become the first president of Clark University in Worcester, Massachusetts, where he also remained a professor of psychology. At Clark, Hall maintained a strong hand in directing and shaping U.S. psychology: "Hall was the Great Graduate Teacher of American psychology. By 1893 eleven of the fourteen PhD degrees from American universities had been given by him; by 1898 this had increased to thirty awarded out of fifty-four" (R. I. Watson, 1978, p. 403).

While at Clark University, Hall invited 26 of the most prominent psychologists in the United States and Canada to meet in Worcester to form an association of psychologists. The meeting took place on July 8, 1892, and represents the founding of the APA. Some of those who were invited did not attend (such as William James and John Dewey), but they were considered charter members because they were invited to join and they supported the association. The group also decided to extend membership in the new organization to five others, including two that Hall had neglected to invite and three recent Leipzig PhDs (including Münsterberg and Titchener). This brought the charter membership in the APA up to 31 (Sokal, 1992). Hall was elected the first president of the APA, and in subsequent years William James and John Dewey would also serve as presidents. Besides being the first president, Hall was one of only two individuals to be elected to the presidency twice; James was the other. However, Hall died in 1924 before he could serve his second elected term. From an original membership of 31, the APA now has more than 154,000 members and affiliates.

In 1891, Hall founded the second U.S. psychological journal, *Pedagogical Seminary*, now the *Journal of Genetic Psychology*. In 1904, he founded the *Journal of Religious Psychology*, and in 1917 the *Journal of Applied Psychology*. Hall maintained an interest in religion, and in 1917 published *Jesus, the Christ, in the Light of Psychology*, which described Jesus as a mythical creation who symbolized all of the best human tendencies. For Hall, the implications of the Jesus myth for humane living were more important than its theological implications:

> The story of his death and resurrection embodied the fundamental rhythm of psychic life, from pain to joy; to experience and understand this rhythm in conversion was the supreme lesson of life. The message Jesus left was not to be projected "upon the clouds" or to be made into a cult for assuring immortality, but was to be realized within each individual, in this world, in service to his fellow man. (Ross, 1972, p. 418)

One critic of the book said, "If it is probable that president Hall has not carefully enough studied the Gospels, it is quite certain that he has not reverently enough studied the person of Jesus Christ" (Kemp, 1992, p. 294). In general, Hall's book was not well received by organized religion.

Developmental Psychology

Hall had many interests, even the histories of philosophy and psychology, to which he made significant contributions (see Bringmann, Bringmann, & Early, 1992). Still, his legacy then and now was primarily in two areas—the psychology of religion and developmental psychology across the life span.

Hall was enamored with evolutionary theory. He said in his autobiography, "As soon as I first heard it in my youth I think I must have been almost hypnotized by the word 'evolution,' which was music to my ear and seemed to fit my mouth better than any other" (1923, p. 357). So strongly did Hall feel about evolutionary theory that he believed that it, instead of physics, should act as a model for science. He believed that evolution explained not only the phylogenetic development of the human species but also the development of each individual. That is, he believed that each individual in his or her lifetime reenacted all evolutionary stages of the human species. This idea, most associated with Ernst Haeckel (1834–1919), is called the **recapitulation theory** of development: "Every child, from the moment of conception to maturity, recapitulates, very rapidly at first, and then more slowly every stage of development through which the human race from its lowest beginnings has passed" (Hall, 1923, p. 380). Haeckel, the premier proponent of evolution in Germany, was part of the Zeitgeist Hall had encountered during his studies there.

During prenatal development, a single-celled organism develops into a newborn child whose capabilities are equal to a number of mammals lower than humans on the phylogenetic scale. In childhood, there is still evidence of the impulsiveness, cruelty, and immorality that characterized earlier, less civilized stages of human development. Hall's view was that if these primitive impulses were not given expression in childhood, they would be carried into adulthood. Hall therefore encouraged parents and teachers to create situations in which these primitive impulses could be given expression.

Hall's Magnum Opus. In 1904, when he was 60 and after 10 years of work, Hall published a two-volume, over 1300-page book titled *Adolescence: Its Psychology and Its Relations to Physiology, Anthropology, Sociology, Sex, Crime, Religion and Education*, which focused on a wide variety of topics, including growth norms, language development, diseases of childhood, hygiene, juvenile crime, lying, showing off, bashfulness, fear, curiosity, and friendship. For Hall, adolescence occurred between ages 14 and 24, and masturbation during that period was discussed in considerable detail. Hall rejected the claim that masturbation caused psychosis, or even death, but he did believe it had a number of less severe consequences: "Neurasthenia … optical cramps … weak sluggishness of heart action … purple and dry skin … anemic complexion, dry cough, and many digestive perversions can be attributed to this scourge of the human race" (1904, Vol. 1, p. 443). In addition, "Growth, especially in the moral and intellectual regions, is dwarfed or stunted" (1904, Vol. 1, p. 444). However, of all the effects of masturbation, Hall believed the most serious to be on the biological quality of the offender's offspring. Revealing his acceptance of Lamarckian theory, he said, "[W]orse and earlier than any of these psychic effects are those that appear in the offspring.… Its effects are manifest, nearer, perhaps, in the incomplete maturity of mind and body in the next generation; in persistent infantilism or overripeness of children" (1904, Vol. 1, p. 444). Masturbation, he said, is "destructive of that perhaps most important thing in the world, the potency of good heredity" (1904, Vol. 1, p. 453).

To discourage this "evil habit," Hall gave the following advice: "Work reduces temptation and so does early rising.… Good music is a moral tonic.… [C]old is one of the best of all checks.… Cold washing without wiping has special advantages.… Pockets should be placed well to the side and not too deep … while habitually keeping hands in the pockets should be discouraged.… Rooms … should not be kept too warm.… Beds should be rather hard and covering should be light" (1904, Vol. 1, pp. 465–469). Hall focused exclusively on masturbation among boys: "Evidently, masturbation among girls was something Hall either did not believe occurred or shied away from as too sensitive and potentially inflammatory to mention" (Arnett, 2006, p. 192).

Hall's Opposition to Coeducation. Hall opposed coeducation, and one of his main arguments for sex-segregated schools was that it enhanced sexual sublimation and, thus, facilitated social progress:

> Sex-segregated schools would hold the sexes apart, not only or simply to allow them to prosper along their natural, different gender trajectories, but also as poles on a battery, separated to avoid the inevitable short circuit, but also because the "hot", passionate, tingling, erotic sensibilities of adolescence, heightened by separation, created an intense field of force, a kind of adolescent social electricity that was Hall's designated path to progress. (Graebner, 2006, pp. 243–244)

Hall believed that "any sexual act not designed to produce offspring was sinful, and the temptation to engage in sinful sex was great if not overwhelming" (Graebner, 2006, p. 239). Hall's proposed solution to the problem was the inhibition of the adolescent sex drive. Such inhibition, he claimed, converts sexual desire into social progress. "Powerful feelings, checked and redirected, erotic energy converted to mental energy: Hall's prescription for adolescence … his recipe for social progress; and an explanation for his own success" (Graebner, p. 240). Although Hall didn't use the term *sublimation* in 1904, he certainly employed the concept, and he did so a year before it appeared in Freud's published works. In later publications, Hall did use the term *sublimation* after he became aware of Freud's definition and use of the term.

Hall viewed females as vital for the future evolution of the human species, and adolescence should be a period when females are trained for motherhood. As females are preparing for motherhood, males still have the need to satisfy primitive impulses, and therefore it makes no sense to include both sexes together in the same educational system:

> The premises of Hall's argument against coeducation were derived from three concerns of recapitulation: (a) that adolescence was a critical period in the development of the reproductive organs in women, (b) that the adolescent male needed freedom to engage in cathartic expression of his savage impulses, and (c) that natural sexual differentiation during adolescence was the basis for later attraction between the sexes. (Diehl, 1986, p. 871)

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As part of his concern for the normal development of the female reproductive capacity, Hall (1906) was worried about what association with males might do to the "normalization" of the menstrual period:

> At a time when her whole future life depends upon normalizing the lunar month, is there not something not only unnatural and unhygienic, but a little monstrous, in daily school associations with boys, where she must suppress and conceal her instincts and feelings, at those times when her own promptings suggest withdrawal or stepping a little aside to let Lord Nature do his magnificent work of efflorescence. (p. 590)

In an address before the American Academy of Medicine in 1906, Hall elaborated his opposition to coeducation:

> It [coeducation] violates a custom so universal that it seems to express a fundamental human instinct.… Girls … are attracted to common knowledge which all share, to the conventional, are more influenced by fashions, more imitative and lack the boy's intense desire to know, be, do something distinctive that develops and emphasizes his individuality. To be thrown on their own personal resources in sports, in the classroom, in nature study and elementary laboratory brings out the best in a boy, but either confuses or strains a girl. (Denmark, 1983, p. 38)

Hall's views on women, although widely accepted at the time, did not go unchallenged. For example, Martha Carey Thomas, a feminist and the president of Bryn Mawr College said, "I had never chanced again upon a book that seemed to me to degrade me in my womanhood as the seventh and seventeenth chapters on women and women's education of President G. Stanley Hall's *Adolescence*" (Denmark, 1983, p. 38).

Diehl (1986) indicates that Hall's views of women were paradoxical (as were Titchener's and Münsterberg's). On one hand, Hall was unambiguously against coeducation, and he believed that the primary role for women was motherhood. On the other hand, at the beginning of the 20th century, Clark University, under Hall's leadership, was considered one of the institutions most open to female graduate students (Cornell was another). In addition, Hall seems to have been highly supportive of female graduate students in psychology as well as many other fields.

In general, Hall urged the study of adolescence because he believed that at this stage of development, habits learned during childhood were discarded but new adult habits had not yet been learned. During this transitional period, the individual was forced to rely on instincts, and therefore adolescence was a very good time to study human instinctual makeup.

Hall's *Adolescence* went through several printings for 20 years after its initial publication. It remained the standard text in the field until it was displaced by Leta Stetter Hollingworth's text *The Psychology of the Adolescent* (1928). Thorndike's assessment of Hall's classic was that it was "chock full of errors, masturbation, and Jesus. He is a mad man" (Ross, 1972, p. 385). What do contemporary psychologists think of Hall's *Adolescence*? Arnett's overall evaluation is positive:

> Many of the findings we view today as new discoveries were already discussed by Hall a hundred years ago. I cannot discuss all of them here, so I will focus on some of the similarities I believe are most notable. Areas of similarity … are the prevalence of depressed mood in adolescence; adolescence as a time when crime rates peak; adolescence as a time of high sensation seeking; susceptibility to media influences in adolescence; characteristics of peer relations in adolescence; and biological development during puberty. (2006, p. 187)

Psychology and Religion

Hall believed that religious conversion during adolescence was "a natural, normal, universal, and necessary process" (1904, Vol. 2, p. 301). Although

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he used Christian terminology to describe this "conversion," Hall was clear that he was not referring to the acceptance of any religious dogma. Sin, for him, was not a state of evil but a sense of limitation and imperfection that should be understood psychologically rather than in terms of religious dogma (1904, Vol. 2, p. 314). He took issue with those who viewed the Bible with "bibliolatry and parasitic literalism" (1904, Vol. 2, p. 330), and he declared "eternal warfare upon orthodoxies and all dogmatic finalities" (1904, Vol. 2, p. 330). So what was the religious conversion that Hall referred to? Rather than embracing a set of religious beliefs, it was the psychological process of subordinating the self to the needs of others. "Self-love merges in resignation and renunciation into love of man: Religion has no other function than to make this change complete … for the love of God and the love of man are one and inseparable" (1904, Vol. 2, p. 304). For Hall, then, the conversion he referred to was "the great conversion from love of self to love of others" (1904, Vol. 2, p. 345).

Most psychologists today, although perhaps sympathetic to Hall's urging adolescents to become less selfish, would not describe that process in religious or spiritual terms. Fewer still would agree the process is normative or universal among adolescents (Arnett, 2006). Nevertheless, as we see in Hall and James, religion was a popular topic for early U.S. psychologists. In 1904, Hall founded *The American Journal of Religious Psychology and Education* which he edited with two former students, James Leuba and Edwin Starbuck. Both Leuba and Starbuck became noted for their empirical studies of religious conversion.

Several of Hall's beliefs are now considered incorrect—for example, his views of sexuality, especially masturbation, and his claim that religious conversion is normative or even universal in adolescence. He embraced the negative racial stereotypes that characterized the Victorian era in which he lived (Youniss, 2006), as well as Lamarckian theory (Arnett, 2006). Also, like Spencer but unlike Darwin, Hall believed that evolution meant progress: "Nothing so reinforces optimism as evolution. It is the best, or at any rate not the worst, that survive. Development is upward, creative, and not decreative. From cosmic gas onward there is progress, advancement, and improvement" (1904, Vol. 2, p. 546). Still, Hall is generally considered a pioneer in educational, child, and adolescent psychology and in parent education and child welfare programs (Brooks-Gunn & Johnson, 2006). As Arnett (2006) concludes, "Who among us can hope to fare as well?" (p. 196). The entire August 2006 issue of *History of Psychology* examines the content of Hall's *Adolescence* and its historical influence.

Hall's interests in both religion and developmental psychology lasted throughout his life. His *Senescence: The Last Half of Life* (1922) can be seen as a forerunner of modern life-span psychology as well as an extension of what he started in *Adolescence*. Hall's *Senescence* is generally considered a classic in the study of aging. Among the topics covered were a cross-cultural analysis of the treatment of the elderly, sources of pleasure, belief in an afterlife, anxiety concerning death, beliefs about longevity, and recognition of the signs of aging. He also reviewed the pension plans available to the elderly in various countries, and he found the United States to be inferior to many countries in this regard. This, of course, was before the Social Security Act of 1935.

Hall's autobiography, *Life and Confessions of a Psychologist*, appeared in 1923, and a year later he died, on April 24, of pneumonia. Ross (1972) comments on an event that occurred at Hall's funeral: "The local minister caused a brief scandal by criticizing Hall for not having appreciated the importance of the institutional church, a scandal which Hall surely would have relished" (p. 436).

Francis Cecil Sumner

The fact that Hall's last graduate student was **Francis Cecil Sumner (1895–1954)**, an African American, further testifies to his willingness to accept students who would have been, or were, rejected elsewhere at the time. Sumner was born in Pine Bluff, Arkansas, just over 30 years after the abolishment of slavery in the United States (1863). Because most African Americans who had been slaves had no last names, Sumner's parents took their name out of respect for the one-time Massachusetts senator Charles Sumner (Guthrie, 2000). Francis attended elementary schools in Virginia, New Jersey, and the District of Columbia. Little was available in the way of secondary education for African Americans at the time, and that little was poor quality, so Francis obtained his secondary education through extensive reading under the guidance of his parents. After passing a written qualifying examination, Sumner was granted admission to Lincoln University, an African American institution in Pennsylvania, at the age of 15. In 1915, at age 20, he received a BA, magna cum laude, with special honors in English, modern language, Greek, Latin, and philosophy. He was then accepted into the undergraduate program at Clark, where he obtained a second BA in 1916. He then returned to Lincoln University as a graduate student, taught several courses in psychology and German, and obtained an MA in 1917.

Sumner applied for admission into doctorate programs at the University of Illinois and American University but was rejected. He then applied directly to G. Stanley Hall, then president of Clark University, who accepted him into the PhD program in psychology. Sumner began his PhD program, but his work was interrupted when he was drafted into the army in 1918. He eventually saw combat in France as a 22-year-old sergeant. During his military service, Sumner and Hall corresponded frequently, and when he was discharged in 1919, Sumner resumed his doctoral studies at Clark. On June 11, 1920, Sumner defended his doctoral dissertation, "Psychoanalysis of Freud and Adler," and on June 14, he, a 24-year-old World War I veteran, became the first African American to obtain a PhD in psychology. In 1920, Sumner accepted a teaching position at Wilberforce University in Ohio and taught at Southern University during the summer of 1921. In the fall of 1921, Sumner accepted the position of chair of the departments of psychology and philosophy at West Virginia Collegiate Institute (WVCI; now West Virginia State College).

Francis Sumner

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While at WVCI, Sumner published two articles (1926, 1927) that argued for segregated higher education for African Americans. Sumner also publicly supported the contention of Booker T. Washington, founder of the Tuskegee Institute in Alabama, that higher education for African Americans should emphasize training in agriculture and various practical trades. However, Sawyer (2000) provides considerable evidence that Sumner's public statements concerning segregated education did not correspond to his private beliefs and activities. Rather, Sawyer argues, Sumner was saying publicly what needed to be said given the social circumstances at the time in order to gain support for African American education. Exemplifying these social circumstances was the statement made in October 1921 by President Warren Harding that social equality between African Americans and whites would never be possible because of "fundamental, inescapable, and eternal differences of race" (Eisenberg, 1960). According to Sawyer, Sumner had a "hidden agenda," and his public statements were fully pragmatic under the circumstances.

In 1928, Sumner resigned from WVCI and accepted a position at Howard University in Washington, DC, where he was charged with improving the quality of the psychology department.

Although during Sumner's time there the highest degree that could be earned was the MA, Howard became a major center for the training of African American psychologists.

Sumner was described by his former students as "a low-keyed and very dedicated psychologist; as a very quiet and unassuming individual who was brilliant with a tremendous capacity to make an analysis of an individual's personality; and as Howard's most stimulating scholar" (Guthrie, 2000, p. 192). Sumner became a fellow of the APA and held memberships in the American Association for the Advancement of Science, American Educational Research Association, Eastern Psychological Association, Southern Society for Philosophy Psychology, and District of Columbia Psychological Association.

On January 12, 1954, Sumner suffered a fatal heart attack while shoveling snow at his home in Washington, DC. As a World War I veteran, he received a military funeral, with honor guard, at Arlington Cemetery in Virginia. He was eulogized by, among others, Mordecai Johnson, the president of Howard University.

By 1972, when Howard first offered the PhD, 300 African Americans had earned PhDs from U.S. colleges and universities. Of these 300, 60 had received a BA or MA from Howard University. Howard was so influential in the training of African American psychologists that it came to be known as the "Black Harvard" (Phillips, 2000).

Psychology and Race. One of the best known products of the Howard psychology program was Kenneth Clark. **Kenneth Bancroft Clark (1914–2005)** arrived at Howard in the fall of 1931 with the goal of eventually studying medicine. After experiencing Sumner's introductory psychology class, Clark declared, "To hell with medical school.… [Psychology] is the discipline for me" (Hentoff, 1982, p. 45). Clark obtained a BA and MA from Howard and remained there as an instructor while his wife, Mamie Phipps Clark (1917–1983), completed her undergraduate work at Howard. For a review of Mamie Phipps Clark's life and accomplishments, see Lal (2002). Concerning Sumner's influence on him, Clark said,

> Professor Sumner had rigorous standards for his students. And he didn't just teach psychology. He taught integrity. And although he led the way for other Blacks in psychology, Sumner would permit no nonsense about there being anything like "Black psychology"—any more than he would have allowed any nonsense about "Black astronomy." In this and in many other ways, Sumner was a model for me. In fact, he has always been my standard when I evaluate myself. (Hentoff, 1982, p. 45)

Clark and his wife went on to obtain their PhDs from Columbia University and subsequently did pioneer work on the developmental effects of prejudice, discrimination, and segregation on children (for example, Clark & Clark, 1939, 1940, 1947, 1950). It was a portion of this research that was featured in a court brief (1952) presented in the 1954 Supreme Court case *Brown v. Board of Education*. The court's decision ended the legal basis for segregated education in the United States and "served as a precursor for legislation barring separate public accommodations based on race" (Guthrie, 2000, p. 181). Perhaps the most famous study considered in the *Brown* case is Clark and Clark (1947), in which two- to seven-year-old black children were shown two sets of dolls that were identical except for skin and hair color. A majority of the black children judged the white dolls to have the "nice color" and indicated that they would be their preferred playmates. Also, when the black children were instructed to "give me the doll that looks like you," 39% of them chose the white doll. Another study considered by the Supreme Court was Deutscher and Chein (1948), in which the opinions of social scientists concerning the effects of enforced segregation were surveyed. The results were a practically unanimous opinion that enforced segregation had detrimental effects on black children, and slightly fewer (83%) also believed it also had detrimental effects on white children. Presumably, it was the information provided by such studies as Clark and Clark (1947) and Deutscher and Chein (1948) that led the Supreme Court to conclude that

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Kenneth Clark and Mamie Phipps Clark

"segregation was psychologically damaging both to minority and majority children" (Jackson, 1998, p. 152).

Although there were several psychologists, sociologists, and other social scientists involved in the efforts to desegregate schools, it is generally agreed that no one was more instrumental than Clark (Benjamin & Crouse, 2002). Perhaps it is ironic that 30 years earlier, Clark's mentor, Sumner, had advocated segregated education. However, Sawyer (2000) concludes, "It is reasonable to believe that Sumner's efforts were in some way responsible both for Clark's contributions and for the change in social climate that enabled the Supreme Court's 1954 decision" (p. 137). Sumner died four months before the *Brown* decision, but he was aware of the impending collapse of the legal basis for segregated education and was proud of the fact that one of his students had played such a significant role in that collapse.

How important was the *Brown* decision? Michael Klarman, a legal scholar, says, "Constitutional lawyers and historians generally deem *Brown v. Board of Education* to be the most important United States Supreme Court decision of the twentieth century, and possibly of all time" (1994, p. 81). Perhaps because psychologists were so instrumental in the *Brown* decision, one might have expected that the APA would have embraced that decision and its implications enthusiastically, but that was not the case. Following *Brown*, the APA was slow to confront racial issues both within its own organization and in U.S. culture in general. Eventually, however, due largely to Clark's efforts, both issues were given considerable attention (e.g., Benjamin & Crouse, 2002; Pickren & Tomes, 2002). In fact, Clark went on to become the first African American president of the APA (1971). One legacy of Clark's presidency was the establishment in 1971 of the Board of Social and Ethical Responsibility in Psychology (BSERP), which provided the APA with a powerful platform from which to deal with social and ethical concerns (Pickren & Tomes, 2002). In 1978, the APA presented Clark with its first Award for Distinguished Contributions to the Public Interest. In 1994, 40 years after the *Brown* decision, the APA presented Clark with its Award for Outstanding Lifetime Contribution to Psychology; he was only the sixth psychologist to receive this prestigious award.

Clark's research, his views, and the extent of his influence have not gone unchallenged. Clark has been criticized for abandoning the neutral objectivity of a scientist and, instead, becoming a political advocate. Phillips (2000) observes that Clark did conduct his investigations within an Afrocentric perspective and made no apologies for doing so (for example, Clark, 1965/1989, pp. xxxv, 78–80). Of course, this stance alienates more objectively oriented psychologists who argue that scientific observations should always be detached—that is, free of value judgments (see, for example, Kendler, 2002). Jackson (2003) argues against Kendler's contention that Clark and his colleagues violated scientific objectivity. Kendler (2003) rebuts Jackson's arguments and elaborates his reasons for believing that Clark and his colleagues did, in fact, violate scientific objectivity.

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For whatever reason, Clark looked back upon his lifelong effort to bring about racial equality as essentially a failure (for example, Clark, 1965/1989, 1986). Phillips (2000) disagrees with Clark's assessment of his own life's work and after reviewing his accomplishments says, "The weight of the historical evidence argues otherwise" (p. 164). Kenneth Clark died at his home in Hastings-on-Hudson, New York, on May 1, 2005, at the age of 90.

Hall's Legacy at Clark University

Hall's 31 years as president of Clark University were colorful, to say the least. Under his leadership, psychology dominated Clark, and Clark was a strong competitor with Harvard for top students and faculty. In 1908, Hall decided to invite prominent European psychologists to Clark University to celebrate its 20th anniversary. Hall sent invitations to both Wundt and Freud, and both invitations were rejected. Wundt rejected the "enticing" invitation because he had already agreed to be the primary speaker at the 500th anniversary of Leipzig University on the date in question. Freud declined because the date conflicted with another commitment and because the honorarium was too small. Hall sent a revised invitation to Freud with a date more compatible with Freud's schedule and with a larger honorarium, and Freud accepted (Rosenzweig, 1985). It is interesting to note that Hall would have been as pleased with Wundt as he was with Freud; he had a deep respect for both.

Hall had long been interested in Freud's ideas, and as part of his recapitulation theory, Hall had suggested that memories of ancestral experiences often unconsciously influence the fantasies of adolescents. There was, therefore, a theoretical kinship between him and Freud and also with Carl Jung, who was also invited to Clark along with Freud. Freud and Jung arrived on September 5, 1909, and, according to Freud, this visit to Clark did much to further the acceptance of his theory throughout the world. For the interesting details of Freud and Jung's visit to the United States, see Rosenzweig (1992).

Early psychology in the United States is often associated with a handful of universities. Thus far we have seen that the first labs and programs were formed at Harvard and Johns Hopkins, and considered Hall's legacy at Clark. Two other schools would come to be the centers of functional psychology—Columbia University in New York and the University of Chicago.

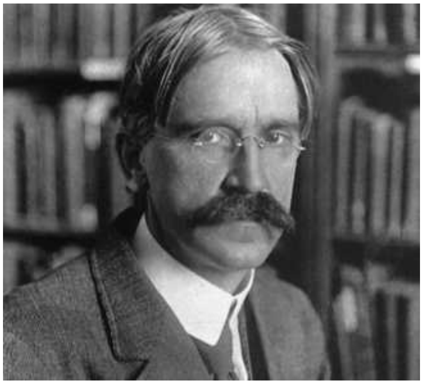
FUNCTIONALISM AT CHICAGO

John Dewey

Despite the fact that functionalism was never a well-defined school of thought, as structuralism was, its founding is commonly attributed to **John Dewey (1859–1952)**, even though James, Münsterberg, and Hall certainly laid important groundwork. Although, as we shall see, Dewey was strongly influenced by James, Shook (1995) indicates that several of Dewey's functionalistic ideas actually came originally from Wundt's voluntarism (see Chapter 9). Dewey was born in Burlington, Vermont. His father, Archibald Sprague Dewey, was a grocer. While attending the University of Vermont as an undergraduate, John Dewey became interested in philosophy. Following graduation, he taught secondary school for three years before entering Johns Hopkins University in 1882 to pursue his interests in philosophy. Dewey had Hall as a teacher but was also strongly influenced by philosopher George S. Morris (1840–1889). Besides psychology, Dewey had a special interest in the philosophies of Hegel and Kant; he wrote his dissertation on Kant's philosophy. Dewey's first academic appointment was at the University of Michigan, where he taught both philosophy and psychology. While at Michigan, Dewey wrote *Psychology* (1886), which was a mixture of Hegelian philosophy and functionalistic psychology. It preceded James's *Principles* by four years. Dewey was at Michigan for 10 years (1884–1894), except for one year spent at the University of Minnesota.

In 1894, Dewey accepted an appointment as chair of the philosophy department at the newly established University of Chicago (at that time, philosophy included psychology and pedagogy). It was at Chicago that Dewey wrote "The Reflex Arc Concept in Psychology" (1896), which for many marks the formal beginning of the school of functionalism. Boring (1953) referred to Dewey's 1896 article as "a declaration of independence for American functional psychology" (p. 146).

Dewey's Analysis of Behavior in Terms of Reflexes. Dewey's primary argument was that dividing the elements of a reflex into sensory processes, brain processes, and motor responses for analysis was artificial and misleading. According to Dewey, dividing behavior into elements was no more justifiable than dividing consciousness into elements. Showing the influence of James's *Principles*, Dewey claimed that there is a stream of behavior just as there is a stream of consciousness. The three elements of a reflex, said Dewey, must be viewed as a coordinated system directed toward a goal, and this goal is usually related to the survival of the organism. Dewey took a child touching a candle flame as an example. The analysis of such behavior in terms of reflexes claims that the child sees the flame of a candle (S) and grasps it (R). The resulting pain (S) then elicits withdrawal (R). According to this analysis, nothing changes, nothing is learned. In reality, however, the experience of being burned changes the child's perception of the flame, and he or she will avoid it next time. This, according to Dewey, could happen only if the child was still observing the flame while being burned and withdrew. Thus, the so-called stimuli and responses are not separate but form an interrelated sequence of functional events. Indeed, for the child, the candle flame is no longer the same stimulus; it now elicits avoidance. Dewey urged that all behavior be viewed in terms of its function—to adapt the organism to its environment. To study elements of the adaptive act in isolation causes one to miss the most important aspect of the act: its purposiveness. "There is simply a continuously ordered sequence of acts, all adapted in themselves and in the order of their sequence, to reach a certain objective end, the reproduction of the species, the preservation of life, locomotion to a certain place" (Dewey, 1896, p. 366).


John Dewey

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As an evolutionist, Dewey thought that social change was inevitable, but he also believed that it could be influenced positively by proper plans of action. Dewey was very influential in creating what came to be called "progressive" education in the United States. He believed that education should be student-oriented rather than subject-oriented and that the best way to learn something was to do it—thus his famous statement that students *learn by doing*. Dewey was very much opposed to rote memorization, drills, and the view that the purpose of education is to transmit traditional knowledge. Material should never be presented as something final or complete. It should be presented in such a way that stimulates personal interest in learning and the development of problem-solving skills:

> Material should be supplied by way of stimulus, not with dogmatic finality and rigidity. When pupils get the notion that any field of study has been definitely surveyed, that knowledge about it is exhaustive and final, they may continue docile pupils, but they cease to be students. (Dewey, 1910/1997, p. 198)

Clearly, Dewey believed that education should facilitate creative intelligence and prepare children to live effectively in a complex society.

As James had, Dewey embraced pragmatism. For both, abstract philosophical concepts were meaningful only insofar as they had practical value. Dewey believed that the concept of democracy has to be made a living truth in the lives of individuals—in their educational experiences, for example. In several influential books, Dewey described how democratic ideals could be, and should be, translated into social action. These include *The School and Society*, 1899; *Interest and Effort in Education*, 1913; *Democracy and Education*, 1916; *Liberalism and Social Action*, 1935; and *Experience and Education*, 1938.

Dewey was always deeply involved in liberal causes, such as the New York Teacher's Union, the American Association of University Professors, and the American Civil Liberties Union. He was also supportive of his wife's promotion of women's suffrage:

> An anecdote was widely circulated at the time that Dewey was marching in a parade supporting women's suffrage carrying a placard that was handed to him. He had not read its message: "Men can vote! Why can't I?" and was puzzled by the amused smiles of the onlookers. (Hilgard, 1987, p. 673)

In 1904, friction with the education department caused Dewey to resign from the University of Chicago and to accept an appointment at Teachers College at Columbia University, where he pursued his interests in education and pragmatic philosophy. He died in New York City on June 1, 1952, at the age of 93.

James Rowland Angell

James Rowland Angell (1869–1949) was born in Burlington, Vermont (the same place as Dewey). He was the son of the long-term president of the University of Michigan. Angell was Dewey's student while Dewey was at Michigan, and after graduating in 1890, Angell remained for a year of graduate training. It was during that year that he attended a seminar conducted by Dewey on James's newly published *Principles*. The seminar switched Angell's primary interest from philosophy to psychology. The following year, Angell went to Harvard and became acquainted with James. The years 1892–1893 were spent traveling and studying in Germany. He attended lectures by Ebbinghaus and started to prepare a doctoral dissertation on Kant's philosophy under the supervision of Hans Vaihinger but never finished. Two master's degrees, one from Michigan in 1891 and one from Harvard in 1892, were his highest degrees.

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James Rowland Angell

In 1893, Angell accepted an instructorship at the University of Minnesota (instead of finishing his doctoral dissertation) but stayed for only one year. In 1894, he accepted a position at the University of Chicago, offered to him by his former teacher, Dewey. Angell was 25 years old at the time, and Dewey was 10 years his senior. Angell, Dewey, and their colleagues were highly productive and influential at Chicago. In 1896, Dewey published his famous article on the reflex arc, and in 1904 Angell published the very popular *Psychology: An Introductory Study of the Structure and Functions of Human Consciousness*. Both Dewey and Angell eventually served as presidents of the APA (Dewey in 1899, Angell in 1906). Angell's presidential address, "The Province of Functional

Psychology," contrasted functional and structural psychology (a distinction that Titchener had originally made in 1898). In his address, Angell made several key points:

- Functional psychology is interested in mental operations rather than in conscious elements, but even mental operations in isolation are of little interest:

  > The functional psychologist … is interested not alone in the operations of mental process considered merely of and by and for itself, but also and more vigorously in mental activity as part of a larger stream of biological forces which are daily and hourly at work before our eyes and which are constitutive of the most important and most absorbing part of our world. The psychologist of this stripe is wont to take his cue from the basal conception of the evolutionary movement, i.e., that for the most part organic structures and functions possess their present characteristics by virtue of the efficiency with which they fit into the extant conditions of life broadly designated the environment. (Angell, 1907, p. 68)

- Mental processes mediate between the needs of the organism and the environment. That is, mental functions help the organism survive. Behavioral habits allow an organism to adjust to familiar situations; but when an organism is confronted with the unfamiliar, mental processes aid in the adaptive process.
- Mind and body cannot be separated; they act as a unit in an organism's struggle for survival.

At the time of Angell's address, functionalism was an established and growing school and a strong competitor to structuralism. By further demonstrating its kinship with evolutionary theory, functionalism encouraged the study of not only consciousness but also animal behavior, child psychology, habit formation, and individual differences. In addition, with its strong pragmatic orientation, it encouraged the application of psychological principles to education, business, and clinical psychology.

Angell was chairman of the psychology department at Chicago for 25 years. Under his leadership, the University of Chicago became a center of functionalism. Among Angell's famous students were Harvey Carr, who we consider next, and John B. Watson, who will be featured in the next chapter. In 1921, Angell left Chicago to become president of Yale University, a post he held until his retirement in 1937. He died on March 4, 1949, in New Haven, Connecticut. For further discussion of Angell's life and accomplishments, see Dewsbury (2003).

Harvey Carr

Harvey Carr (1873–1954), born in Indiana, obtained his bachelor's and master's degrees from the University of Colorado and then went to the University of Chicago, where he received his doctorate in 1905 under the supervision of Angell. Carr stayed at Chicago throughout his professional life, and in 1926, he was elected president of the APA.

In 1925, Carr wrote *Psychology: A Study of Mental Activity*. Mental activity was "concerned with the acquisition, fixation, retention, organization, and evaluation of experiences, and their subsequent utilization in the guidance of conduct" (Carr, 1925, p. 1). We see in Carr's definition the functionalist's concern with the learning process. Because learning is a major tool used in adjusting to the environment, it was a major concern of the functionalists. Central to Carr's psychology is what he called the **adaptive act**, which has three components: (1) a motive that acts as a stimulus for behavior (such as hunger or thirst), (2) the environmental setting or situation the organism is in, and (3) a response that satisfies the motive (such as eating or drinking). Here again, we see the influence of evolutionary theory on functionalism: Needs must be met for organisms to survive. Needs motivate behavior until an act satisfies the need, at which point learning occurs; and the next time the organism is in the same situation and experiences the same need, the organism will tend to repeat the behavior that was effective previously. For Carr, both perception and behavior were necessary in adapting to the environment because how the environment is perceived determines how an

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Harvey Carr

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organism responds to it. Seeing a wild animal in a zoo and seeing one while walking through the forest would elicit two different reactions.

Besides the adaptive act, Carr (1925) included sections on the human nervous system and sense organs, learning, perceiving, reasoning, affection, volition, individual differences, and the measurement of intelligence. Carr had a special interest in space perception and wrote an entire book on the topic (Carr, 1935). Although Carr, like the other functionalists, accepted both introspection and experimentation as legitimate methods, the latter became the favored research technique. One reason for this preference was the growing success of animal research in which introspection was, of course, impossible. Showing both the pragmatism that characterized functionalism and a similarity to Wundt's *Völkerpsychologie*, Carr believed that literature, art, language, and social and political institutions should be studied in order to better understand the nature of the mind that produced them.

Heidbreder divided the functionalistic movement into three phases: "its initiation by Dewey, its development under Angell's leadership, and its preservation as a definite influence by Carr" (1933, pp. 208–209).

FUNCTIONALISM AT COLUMBIA

James McKeen Cattell

Functionalism took on a slightly different appearance under **James McKeen Cattell (1860–1944)**, who, as noted in Chapter 10, was strongly influenced by Galton. In 1891, Cattell accepted a professorship at Columbia University, where he stayed for 26 years. Cattell did basic research in such areas as reaction time, psychophysics, and mental testing. As we have seen, Cattell followed Galton in assuming that intelligence could be measured by studying sensory and motor abilities. In fact, he used many of the same tests Galton had used—for example, dynamometer pressure, least noticeable difference in weight, and reaction time.

Cattell and Applied Psychology. Cattell said that "sciences are not immutable species, but developing organisms" (1904, p. 176). This being so, why not experiment with ideas and methods? Who knows what may prove to be valuable? "Let us take a broad outlook and be liberal in our appreciation; let us welcome variations and sports; if birth is given to monstrosities on occasion, we may be sure that they will not survive" (Cattell, p. 180). But, true to the pragmatic spirit, Cattell believed that ideas and methods should always be evaluated in terms of their usefulness:

> If I did not believe that psychology affected conduct and could be applied in useful ways, I should regard my occupation as nearer to that of the professional chess-player or sword swallower than to that of the engineer or scientific physician. (1904, p. 185)

According to Cattell, almost everyone attempts to apply psychological principles in what they do: "All our systems of education, our churches, our legal systems, our governments and the rest are applied psychology" (1904, p. 186). It is not, then, a matter of whether behavior should be controlled or not. It is a matter of using the most valid knowledge of psychological principles in exercising

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that control. Here psychology can be extremely helpful:

> It certainly is not essential and perhaps is not desirable for every mother, for every teacher, for every statesman, to study psychology, especially the kind of psychology at present available. It is not necessary for a man to be either a psychologist or a fool at forty; he may, for example, be both. But surely it is possible to discover whether or not it is desirable to feed a baby every time it cries, to whip a boy when he disobeys or to put a man in prison when he breaks a law. If each man were given the work he is most competent to do and were prepared for this work in the best way, the work of the world all the way from the highest manifestations of genius to the humblest daily labor would be more than doubled. I see no reason why the application of systematized knowledge to the control of human nature may not in the course of the present century accomplish results commensurate with the nineteenth century applications of physical science to the material world. (Cattell, 1904, p. 186)

In 1895, when he was only 35 years old, Cattell was elected as the fourth president of the APA, following William James. Also in 1895, Cattell purchased the financially troubled journal *Science*. Under Cattell's leadership, *Science* overcome its difficulties and in 1900 became the official publication of the American Association for the Advancement of Science (AAAS). In 1894, along with James Mark Baldwin, Cattell founded the third U.S. psychology journal, *Psychological Review*. Cattell was part owner and editor of *Psychological Review* from 1894 to 1904. Editing and entrepreneurship took more and more of Cattell's time, and eventually he established his own publishing firm, Science Press. Soon he became sole owner, publisher, and editor of a number of journals, including *Psychological Review*, *Science*, *Popular Science Monthly*, *The American Naturalist*, and *School and Society*. In 1921, Cattell (along with Thorndike and Woodworth) founded the Psychological Corporation, designed to provide a variety of services to education and industry. The Psychological Corporation continues to thrive.

By 1917, Cattell had a rather negative relationship with the president of Columbia. Cattell had been instrumental in the founding of the American Association of University Professors (AAUP), which favored complete academic freedom and tenure. He was elected president of AAUP in 1925. It was Cattell's pacifism, however, that led to his dismissal from Columbia:

> [The president of Columbia University] fired him from his position on the Columbia faculty because of a letter he had written on Columbia University stationery urging that draftees not be sent overseas against their will. It was believed that the charge of pacifism was behind the firing, and other members of the faculty … resigned from Columbia in protest. (Hilgard, 1987, p. 748)

Nonetheless, under Cattell's influence, Columbia became a stronghold of functionalism:

> Cattell was very active at Columbia between 1891 and 1917, during which time Columbia became the leading producer of PhDs in psychology. In 1929, of the 704 APA members possessing the doctorate, 155 had their degrees from Columbia, with Chicago second with 91.… If we count both Chicago and Columbia as essentially centers of functional psychology, they together accounted for 35% of the PhDs in the APA. There is little doubt that functionalism was the typical American psychology, for the Columbia and Chicago products were scattering their influence on colleges and universities throughout the country. (Hilgard, 1987, p. 84)

Like James and Hall, Cattell was a major figure in early U.S. Psychology. He was an adventurous and sporting man, often associated with rivalry and controversy (Sokal, 1971). For a time he was Wundt's closest assistant. He brought Galton's ideas and testing to America. Soon after Cattell arrived at Columbia in 1891, Robert Woodworth and Edward Thorndike joined him as his students. They, too, were destined to become leading representatives of functionalism. Cattell died on January 20, 1944.

Robert Sessions Woodworth

Born in Belchertown, Massachusetts, **Robert Sessions Woodworth (1869–1962)** graduated from Amherst College in Massachusetts. Following graduation, he taught high school for two years and then mathematics at Washburn College for two more years. After reading James's *Principles*, he decided to go to Harvard to study with James. He received his master's degree in 1897 and remained to work in Harvard's physiological laboratory. Woodworth then moved to Columbia and obtained his doctorate in 1899 under the supervision of Cattell. Following graduation, he taught physiology at New York Hospital and then spent a year in England studying with the famous physiologist Sir Charles Sherrington. In 1903, he returned to Columbia where he stayed for the remainder of his career.

As were all functionalistic psychologists, Woodworth was interested in what people do and why they do it—especially why. He was primarily interested in motivation, so he called his brand of psychology **dynamic psychology**. Like Dewey, Woodworth disagreed with those who talked about adjustments to the environment as a matter of stimuli, brain processes, and responses. Some psychologists even left out the brain mechanisms and spoke only of S–R (stimulus–response) relationships. Woodworth chose the symbols S–O–R (stimulus–organism–response) to designate his theory in order to emphasize the importance of the organism. He used the term *mechanism* much as Carr had used the term *adaptive act*—to refer to the way an organism interacts with the environment in order to satisfy a need. These mechanisms, or adaptive behavior patterns, remain dormant unless activated by a need (drive) of some type. Thus, in the *same* physical environment, an organism acts differently depending on what need, or *drive*, is present. According to Woodworth, the internal condition of the organism activates the organism's behavior.

Robert Sessions Woodworth

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Although we have included Woodworth among the functionalists, he was always willing to entertain a wide variety of ideas and believed none of them religiously. He lectured on such topics as abnormal psychology, social psychology, and tests and statistics, and he gave seminars on movement, vision, memory, thinking, and motivation. His books included *Elements of Physiological Psychology* (along with Edward Trumbull Ladd, 1911); *Contemporary Schools of Psychology* (1931); *Experimental Psychology* (1938); and his final book, *Dynamics of Behavior* (1958), written when he was 89. Woodworth's text *Experimental Psychology* (revised in 1954 with Harold Schlosberg) remained the standard text in experimental psychology courses for decades.

Woodworth believed that psychologists should accept valid information about humans no matter from where it comes, and he believed that psychologists should maintain a middle-of-the-road, or eclectic, attitude:

> Suppose we should organize a world's tournament or Olympic contest of

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> psychologists, and should assemble the two or three thousand of them on some large field, with banners raised here and there as rallying points for the adherents of the several schools—a banner here for Freud, a banner there for Adler, one for Jung, one for McDougall, one for the Gestalt school, one for the behaviorists, and one for the existentialists, with perhaps two or three other banners waving for schools which I have not mentioned. After all the loyal adherents of each school had flocked to their respective banners, there would remain a large body in the middle of the field, or in the grandstand ready to watch the jousting. How many would thus remain unattached? A majority? I am convinced it would be a large majority. (Woodworth, 1931, p. 205)

Though often criticized for his eclecticism, Woodworth did not care much. In response to being chided for sitting on the fence in one prevailing controversy, Woodworth (1931) said, "Well, in support of this position it may be said that it is cooler up here and one has a better view of all that is going on" (p. 216).

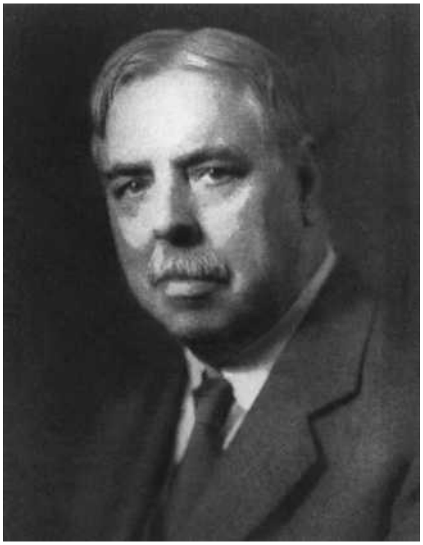
Woodworth was President of the APA in 1914, and the first recipient of the Gold Medal presented by the American Psychological Foundation (1956). The inscription indicated that the award was for "unequaled contributions in shaping the destiny of scientific psychology." Woodworth's six-decade affiliation with Columbia University ended when he died on July 4, 1962, at the age of 92.

Edward Lee Thorndike

Edward Lee Thorndike (1874–1949) was born in Williamsburg, Massachusetts, the son of a Methodist minister. He entered Wesleyan University in Connecticut in 1891 and earned his bachelor's degree in 1895. At Wesleyan, the psychology courses did not interest him much, but reading James's *Principles* did. After Wesleyan, Thorndike went to Harvard, where he earned a master's degree in 1897. While at Harvard, he took a course from James, and the two became good friends. When he first moved to Cambridge, Thorndike was raising chicks in his bedroom to be used as experimental subjects. When his landlady forbade him from continuing this practice, James tried to get laboratory space for him at Harvard. When the effort failed, James allowed Thorndike to continue his research in the basement of his home.

After receiving his master's degree from Harvard, Thorndike accepted a fellowship at Columbia where, like his lifelong friend Woodworth, he worked under Cattell's supervision. His doctoral dissertation, titled "Animal Intelligence: An Experimental Study of the Associative Processes in Animals," was published in 1898 and was republished in 1911 as *Animal Intelligence*. Thorndike's dissertation was the first in psychology in which nonhumans served as subjects (Galef, 1998).

After obtaining his doctorate in 1898, Thorndike began teaching at the College for Women at Case Western Reserve University, but after a year, he returned to Columbia, where he remained until his retirement in 1940. After retirement, he continued to write until his death in 1949 at the age of 74. During his career, Thorndike was extremely productive, and



Edward Lee Thorndike

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at the time of his death his bibliography comprised 507 books, monographs, and journal articles. He did pioneer work not only in learning theory (for which he is most famous) but also in the areas of educational practices, verbal behavior, comparative psychology, intelligence testing, transfer of training, and the measurement of sociological phenomena. As an example of the last, he wrote *Your City* (1939), in which he attempted to quantify the "goodness of life" in various cities. Like Galton, Thorndike had a penchant to measure everything. Also like Galton, Thorndike believed intelligence to be highly heritable. Thorndike believed that educational experiences should be stratified according to a student's native intellectual ability. About the attempt to provide equal education to all children, he said, "It is wasteful to attempt to create and folly to pretend to create capacities and interests which are assumed or denied to an individual at birth" (1903, p. 44). However, Thorndike did not believe gender differences in intellectual ability were substantial enough to support arguments against coeducation. After reviewing the data, he concluded, "Differences in ability [are] not of sufficient amount to be important in arguments concerning differentiation of the curriculum or of methods of teaching in conformity of sex differences" (1903, p. 118).

Thorndike's work was to have a significant influence on psychology, and it can be seen as representing the transition from the school of functionalism to the school of behaviorism. We will review the reasons for this shortly, but first we look at the nature of animal research prior to Thorndike's work.

Animal Research before Thorndike. Modern comparative psychology clearly started with the works of Darwin, specifically with his book *The Expression of Emotions in Man and Animals* (1872). Darwin's work was taken a step further by his friend **George John Romanes (1848–1894)**, who wrote a book also titled *Animal Intelligence* in 1882 and *Mental Evolution in Animals* in 1884. In a third book, *Mental Evolution in Man* (1888), Romanes attempted to trace the evolution of the human mind. All of Romanes's evidence was anecdotal, however, and he was often guilty of *anthropomorphizing*, or attributing human thought processes to nonhuman animals. For example, Romanes attributed such emotions as anger, fear, and jealousy to fish; affection, sympathy, and pride to birds; and slyness and keen reasoning power to dogs. The following is an example of how Romanes attributed human motives and intelligence to nonhuman animals:

Courtesy of the National Library of Medicine

George John Romanes

> One day the cat and the parrot had a quarrel. I think the cat had upset Polly's food, or something of that kind; however, they seemed all right again. An hour or so after, Polly was standing on the edge of the table; she called out in a tone of extreme affection, "Puss, puss, come then—come then, pussy." Pussy went and looked up innocently enough. Polly with her beak seized a basin of milk standing by, and tipped the basin and all its contents over the cat; then chuckled diabolically, of course broke the basin, and half drowned the cat. (Sargent & Stafford, 1965, p. 149)

Romanes died on May 23, 1894, at the age of 46. The parrot was not involved.

Conwy Lloyd Morgan (1852–1936) sought to correct Romanes's excesses by applying the principle that has come to be known as **Morgan's canon**: "In no case may we interpret an action as the outcome

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of the exercise of a higher psychical faculty, if it can be interpreted as the outcome of the exercise of one which stands lower in the psychological scale" (Morgan, 1894, p. 53). Morgan's canon is often mistakenly interpreted as an argument against speculation about the existence of private thoughts and feelings in nonhuman animals. Morgan, however, believed that both human and nonhuman behavior is purposive and that purposes or intentions are experienced mentally. Rather than avoiding mentalism, he argued that comparative *psychology* would be impossible unless both humans and nonhumans possessed mental processes. Following Darwin, Morgan believed that mental events facilitate survival and that there is a gradation of those events across species. Morgan's canon was also mistakenly believed to be an argument against anthropomorphizing. On the contrary, Morgan believed that the cognitive processes of nonhuman animals could be understood *only* relative to our own:

> Our interpretation of animal intelligence is necessarily based on a double or two-fold process of observation: 1st, the activities of animals have to be carefully observed as objective phenomena; 2nd, our own mental processes have to be carefully observed and cautious inductions drawn from them. Finally the objective phenomena reached by the first process have to be interpreted in terms of conclusions obtained through the second. (Costall, 1993, p. 120)

So what was the purpose of Morgan's canon? Primarily its purpose was to avoid *anthropocentrism*, the belief that nonhuman cognitive processes are the same as those of humans. The problem with the anecdotal evidence provided by Romanes and others was that it equated human and nonhuman intelligence. With his canon, Morgan urged researchers not to attribute nonhuman behavior to reflective, rational thoughts when it could be explained in terms of simpler cognitive processes. In a sense, Morgan was attempting "to put anthropomorphizing on a sound scientific basis" (Costall, 1993, p. 120).

Morgan (1894) believed that nonhuman animals could not possibly possess many of the human attributes that Romanes and others had attributed to them: "A sense of beauty, a sense of the ludicrous, a sense of justice, and a sense of right and wrong—these abstract emotions or sentiments, as such, are certainly impossible to the brute" (p. 403).

Conwy Lloyd Morgan

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In the following excerpt, Morgan (1894) offered what he considered a proper account of how his dog developed the ability to open a garden gate:

> The way in which my dog learnt to lift the latch of the garden gate and thus let himself out affords a good example of intelligent behaviour. The iron gate is held to by a latch, but swings open by its own weight if the latch be lifted. Whenever he wanted to go out the fox terrier raised the latch with the back of his head, and thus released the gate, which swung open. Now the question in any such case is: How did he learn the trick? In this particular case the question can be answered, because he was carefully watched. When he was put outside the door, he naturally wanted to get out … where there was much to tempt him—the chance of a run, other dogs to

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Margaret Floy Washburn

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> sniff at, possible cats to be worried. He gazed eagerly out through the railings on the low parapet wall … and in due time chanced to gaze out under the latch, lifting it with his head. He withdrew his head and looked out elsewhere but the gate had swung open. Here was a fortunate occurrence arising out of the natural tendencies of a dog. But the association between looking out just there and the open gate … is somewhat indirect. The coalescence of the presentative and representative elements into a conscious situation effective for the guidance of behaviour was not effected at once. After some ten or twelve experiences, in each of which the exit was more rapidly effected, … the fox terrier learnt to go straight and without hesitation to the right spot. *In this case the lifting of the latch was unquestionably hit upon by accident, and the trick was only rendered habitual by repeated association in the same situation of the chance act and happy escape.* Once firmly established, however, the behaviour remained constant. (p. 144)

Morgan's report of his dog's behavior describes the trial-and-error learning that was to become so important in Thorndike's research. Incidentally, Bain (Chapter 5) had described essentially the same kind of trial-and-error learning as Morgan described above in 1855.

Comparative Psychology. In 1908, **Margaret Floy Washburn (1871–1939)** published *The Animal Mind*, which went through four editions, the last appearing in 1936. As mentioned in Chapter 9, Washburn was Titchener's first doctoral candidate and became the first woman to receive a doctorate in psychology in 1894. Upon receipt of her degree, Washburn became a member of the APA, joining two other women, Christine Ladd-Franklin and Mary Calkins.

Washburn, Ladd-Franklin, Calkins, and Hollingworth were not the only women associated with early U.S. psychology. Angell's doctoral students included Helen Thompson Woolley who focused on child development and child welfare, as well as June Etta Downey who founded the psychology program at the University of Wyoming. Millicent Shinn, the cousin of Calkins's chair—Edmund C. Sanford, was the first woman to receive a PhD from the University of California. She is best known for developmental studies of her infant niece, published in 1900 as *The Biography of a Baby*. Ethel Puffer Howes studied with Münsterberg both in Germany and at Harvard, and was an advocate for women's suffrage as it related to the conflict between family and career faced by women in academia (e.g., Howes, 1929).

After brief affiliations with Wells College, Sage College, and the University of Cincinnati, Washburn accepted an appointment at her alma mater, Vassar College, in 1903. During her more than three decades at Vassar, she published over 70 articles—mainly on animal psychology—and was active in the administrative activities of the APA and other psychological organizations. In 1921, in recognition of her many accomplishments, Washburn was elected the second female president of the APA (Calkins was the first). In her presidential address (1922), Washburn criticized Watson's

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behaviorism and praised Gestalt psychology for its willingness to study consciousness. In 1931, she was awarded membership in the National Academy of Sciences, only the second woman to be granted membership in that distinguished organization (Florence Sabin, MD, was the first).

In *The Animal Mind*, Washburn, like Morgan, was primarily interested in inferring consciousness in animals at all phylogenetic levels. To index consciousness in animals, she summarized hundreds of experiments in such areas as sensory discrimination, space perception, and learning ability. Although her primary concern was with animal consciousness, her use of controlled behavior to index mental events was similar to the approach taken by many contemporary cognitive psychologists. For an overview of Washburn's life and accomplishments, see Viney and Burlingame-Lee (2003).

Comparative animal psychology flourished under functionalism. Recall that Yerkes was primarily an animal researcher, and was drawn into intelligence testing only as a result of WW I. The "father of behaviorism," John Watson started working with animals for his PhD at Chicago. Walter Hunter (APA President 1931) also completed his PhD at Chicago in 1912 studying animal memory on the advice of Carr. Hunter and Gilbert Van Tassell Hamilton are remembered for novel comparisons involving humans paired with other species on the same task. Fox example in his 1913 monograph "The delayed reaction in animals and children," Hunter includes as subjects 22 rats, 2 mongrel rat terriers, 4 raccoons (Bob, Betty, Jack, Jill), and 5 children (known only by initials). Similarly, Hamilton (1911, 1916) compared problem-solving strategies in mice, gophers, horses, dogs, monkeys, baboons, human children, and normal and deficient human adults.

Thorndike's Puzzle Box. To investigate systematically the trial-and-error learning that Morgan had described, Thorndike used a **puzzle box** like the one shown in Figure 11.1.

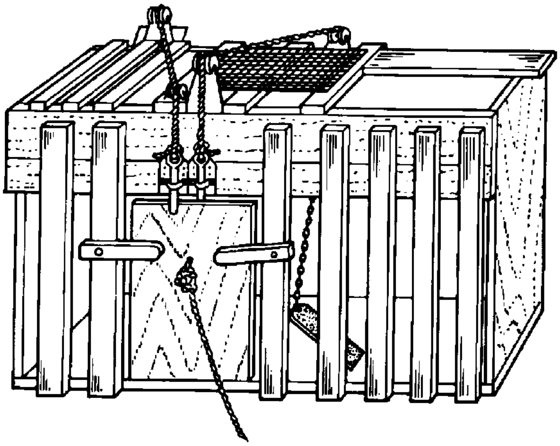

FIGURE 11.1

The puzzle box Thorndike used in his experiment with cats.

Source: Thorndike (1898)

Although during his career Thorndike used chicks, rats, dogs, fish, monkeys, and humans as research subjects, his work with the puzzle box involved cats. The box was arranged so that if the animal performed a certain response, the door opened, and the animal was allowed to escape; in addition, the animal received a reward such as a piece of fish.

From his numerous puzzle-box experiments, Thorndike reached the following conclusions:

- Learning is incremental. That is, it occurs a little bit at a time rather than all at once. With each successful escape, subsequent escapes were made more quickly.
- Learning occurs automatically. That is, it is not mediated by thinking.
- The same principles of learning apply to all mammals. That is, humans learn in the same manner as all other mammals.

With these observations, Thorndike was very close to being a behaviorist. If thinking was not involved in learning, what good was introspection in studying the learning process? And if animals and humans learn in the same way, why not simplify the situation by studying only nonhuman animals?

Thorndike believed that sense impressions and responses are connected by neural bonds. He also believed that the probability of a response being

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made in the presence of a particular sensory event (stimulus) is determined by the strength of the neural connection between the stimulus and the response. Thorndike's concern was not with how *ideas* become associated but with how neural connections or bonds between sensory impressions and responses change their strength as a function of experience. Because of this concern, Thorndike's theory is often referred to as **connectionism**.

The Laws of Exercise and Effect. To account for his research findings, Thorndike developed psychology's first major theory of learning. The theory basically combined associationism and hedonism, which had been prevalent for centuries, but Thorndike stated his principles with precision and supported them with ingenious experimentation. His own research findings actually forced him to make major revisions in his own theory. The early version of his theory consisted mainly of the laws of exercise and effect. The **law of exercise** had two parts: the law of use and the law of disuse. According to the law of use, the more often an association (neural connection) is practiced, the stronger it becomes. This was essentially a restatement of Aristotle's law of frequency. According to the law of disuse, the longer an association remains unused, the weaker it becomes. Taken together, the laws of use and disuse stated that we learn by doing and forget by not doing.

Thorndike's early **law of effect** was that if an association is followed by a "satisfying state of affairs," it will be strengthened, and if it is followed by an "annoying state of affairs," it will be weakened. In modern terminology, Thorndike's law of effect was that reinforcement strengthens behavior whereas punishment weakens it.

In September 1929, Thorndike began his address to the International Congress of Psychology with the dramatic statement, "I was wrong." He was referring to his early theory of learning. Research had forced him to abandon his law of exercise completely, for he had found that practice *alone* did not strengthen an association and that the passage of time *alone* (disuse) did nothing to weaken it. Besides discarding the law of exercise, Thorndike discarded half of the law of effect, concluding that a satisfying state of affairs strengthens an association but that an annoying state of affairs does not weaken one. In modern terminology, Thorndike found that reinforcement is effective in modifying behavior, but punishment is not.

Under the influence of evolutionary theory, Thorndike added a behavioral component to associationism. Rather than focusing on the association of one *idea* to another, he studied the association between the environment and behavioral responses. Although Thorndike's brand of psychology is generally viewed as being within the framework of functionalism (because Thorndike believed that only useful associations are selected and maintained), his insistence that learning occurs without ideation brought him very close to being a behaviorist.

The Transfer of Training. In 1901, Thorndike and Woodworth combined their skills to examine the contention of some early faculty psychologists that the faculties of the mind could be strengthened by practicing the attributes associated with them. For example, it was believed that studying a difficult topic, such as Latin, could enhance general intelligence. Such a belief was sometimes called the "mental muscle" approach to education and sometimes formal discipline. Thorndike and Woodworth's study, which involved 8,564 high school students, found no support for this contention. Then why did it seem that more difficult courses produced brighter students? Thorndike (1924) summarized his earlier research with Woodworth as follows:

> By any reasonable interpretation of the results, the intellectual values of studies should be determined largely by the special information, habits, interests, attitudes, and ideals which they demonstrably produce. The expectation of any large differences in general improvement of the mind from one study rather than another seems doomed to disappointment. The chief reason why good thinkers seem superficially to have been made such by having taken certain school studies, is that good

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> thinkers have taken such studies, becoming better by the inherent tendency of the good to gain more than the poor from any study. When the good thinkers studied Greek and Latin, these studies *seemed* to make good thinking. Now that the good thinkers study physics and trigonometry, these seem to make good thinkers. If abler pupils should all study physical education and dramatic art, these subjects would seem to make good thinkers.… After positive correlation of gain with initial ability is allowed for, the balance in favor of any study is certainly not large. (p. 98)

Thorndike answered the mental muscle approach to education with his **identical elements theory of transfer**, which states that the extent to which information learned in one situation will transfer to another situation is determined by the similarity between the two situations. If two situations are exactly the same, information learned in one will transfer completely to the other. If there is no similarity between two situations, information learned in one will be of no value in the other. The implication for education is obvious: Schools should teach skills that are similar to those that will be useful when students leave school. Rather than attempting to strengthen the faculties of the mind by requiring difficult subjects, schools should emphasize the teaching of practical knowledge. Thorndike's research did not silence the debate between those who saw the goal of education as the strengthening of the faculties of the mind and those (like Thorndike) who claimed that the goal should be the teaching of specific transferable skills. Even today, some researchers claim that Thorndike was premature in his rejection of formal discipline (for example, Lehman, Lempert, & Nisbett, 1988).

Among Thorndike's many honors were being elected president of the New York Academy of Sciences (1919–1920), of the American Association for the Advancement of Science (1934), of the APA (1912), and of the Psychometric Society (1936–1937); and he was an honorary member of the British Psychological Society and the Leningrad Scientific-Medical Pedagogical Society.

Many consider Thorndike the greatest learning theorist of all time, and his ideas still influence current psychology through the work of B. F. Skinner, whom we detail in the next chapter. Thorndike is usually considered a functionalist, Skinner a behaviorist. Thorndike is not usually labeled a behaviorist given his eclectic interests, including the study of human consciousness (Samelson, 1981). Thorndike also worked extensively in the practical areas of pedagogy and measurement. He truly revolutionized schoolbooks and dictionaries, developed various psychological tests, and supervised graduate students in psychometrics (e.g., E. E. "Ted" Cureton).

BEYOND FUNCTIONALISM

The early years of U.S. psychology were certainly exciting, but as we have seen somewhat chaotic. In 1903, Cattell attempted to assess the eminence of the various figures in American psychology—his "top 10" were James first, himself second, then Münsterberg, Hall, Baldwin, Titchener, Royce, Ladd, Dewey, and Jastrow. Although previously mentioned in passing, Ladd was another philosopher-psychologist with interests in religion and education, much like James and Hall. He authored several popular texts and is most associated with Yale, although he served as a diplomatic and educational advisor to Japan. He was the second president of the APA.

James Mark Baldwin (1861–1934) was the APA's sixth president, and as earlier noted cofounded the *Psychological Review* with Cattell. He was also the first editor of APA's other flagship journal, *Psychological Bulletin*. Born in Columbia, South Carolina, he spent a year with Wundt but earned his PhD in philosophy at Princeton. After a short teaching stint at Lake Forest College, he went to the University of Toronto where he created the first psychology laboratory in Canada. Following a trip to France where he visited with Charcot and Janet (both in Chapter 16), he returned to Princeton and started its psychology program. In 1903, he moved to Johns Hopkins and resurrected its famous psychology laboratory, which had closed after Hall left for Clark.

Courtesy of Department of Psychology, University of Toronto

James Mark Baldwin

In 1908, Baldwin's career at Hopkins ended when he was caught in a raid at a house of prostitution. He spent the remainder of his life in Europe and Mexico (where he popularized psychology), but continued his influential work. Baldwin wrote in the history of psychology, and is considered by some as the rightful founder of both social psychology and child psychology. His views on child cognitive development form the basis of much of Jean Piaget's work. Baldwin was also an evolutionary theorist and sought to make explicit the connection between evolution and functional psychology. The Baldwin Effect, postulated in 1896, remains controversial but is still considered today as the mechanism for a possible link between learning and evolution.

The fact that your introductory or developmental course surely covered Piaget extensively, but likely didn't mention Baldwin is telling for what happened to functionalism. It did not die as a school as structuralism had, but was absorbed. According to Chaplin and Krawiec (1979),

> As a systematic point of view, functionalism was an overwhelming success, but largely because of this success it is no longer a distinct school of psychology. It was absorbed into the mainstream psychology. No happier fate could await any psychological point of view. (p. 53)

Similarly, Hilgard (1987) said, "[Functionalism] declined as a recognized school, destroyed by its success, and, in part, by the success of its intellectual progeny, behaviorism" (p. 88). It is to behaviorism that we turn in the next chapter.

SUMMARY

Before functionalism, psychology in the United States passed through three stages. During the first stage (1640–1776), psychology was primarily moral philosophy, although some of John Locke's empiricism was taught. During the second stage (1776–1886), the Scottish commonsense philosophy was taught, but the relationship to religion was still emphasized. During this second stage, textbooks began to appear that contained chapters on topics constituting much of today's psychology—for example, perception, memory, language, and thinking. In the third stage (from 1886 onward), psychology separated from religion, and the groundwork for an objective, practical psychology was laid.

William James published the *Principles* (1890), thus laying the foundation for what was to become the school of functionalism. Concurrently, Titchener created the school of structuralism at Cornell (1892). Early U.S. psychology was characterized by the emergence of functionalism, the beginning of which is often marked by the 1896 publication of Dewey's paper on the reflex arc. Although functionalism was never a clearly defined

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school, it did have the following characteristics: it opposed elementism; it was concerned with the function of mental and behavioral processes; it was interested in the practical applications of its principles; it accepted a Darwinian model of humans rather than a Newtonian model; it embraced a wide range of topics and methodologies; it was extremely interested in motivation; and it was more interested in the differences among individuals than in their similarities.

Following Darwin, James believed that mental events and overt behavior always have a function. Rather than studying consciousness as a group of elements that combined in some lawful way, as physical elements do, James viewed consciousness as a stream of ever-changing mental events whose purpose is to allow the person to adjust to the environment. For James, the major criterion for judging an idea is the idea's usefulness, and he applied this pragmatism to the idea of free will. James believed that while working as a scientist, a person has to accept determinism; while not playing the role of scientist, however, a person can accept free will and feel responsible for his or her activities, instead of feeling as if one is a victim of circumstance. James believed that much of behavior is instinctive and much of it learned. According to the James–Lange theory of emotion, an individual first reacts behaviorally and then has an emotional reaction. Everywhere in James's writings, one sees his pragmatism: Ideas are to be evaluated only in terms of their usefulness or "cash-value." In many ways, psychology today is the type of psychology James outlined—a psychology willing to embrace all aspects of human existence and to employ those techniques found to be effective.

James chose Münsterberg to replace him as director of the Harvard Psychology Laboratory. At first, Münsterberg concentrated on performing controlled laboratory experiments, but his interests turned more and more to the application of psychological principles to problems outside of the laboratory. In developing his applied psychology, Münsterberg did pioneer work in clinical, forensic, and industrial psychology. Although at one time he was one of the most famous psychologists in the world, he died in obscurity because his efforts to improve relations between the United States and Germany came at a time when the U.S. populace was disgusted with Germany. Mary Whiton Calkins studying under Münsterberg's supervision met all of Harvard's requirements for the PhD, but was denied the degree because she was a woman. Nonetheless, she went on to become the first female president of the APA, and through her self-psychology, she influenced the development of a U.S. brand of personality theory.

Hall was the first American to obtain a doctorate specifically in psychology, Hall was Wundt's first U.S. student; he created the first working psychology laboratory in the United States in 1883, and he created the first U.S. journal dedicated exclusively to psychological issues. As president of Clark University, he invited Freud to deliver a series of lectures, which helped psychoanalysis gain international recognition and respect. Hall also founded the APA and was its first president. Combining his studies of children, adolescents, and the elderly, Hall anticipated what was later called life-span psychology. Along with James and Münsterberg, Hall incorporated Darwinian theory into psychology and, in so doing, helped pave the way for the school of functionalism. It was under Hall's supervision that Francis Cecil Sumner became the first African American to obtain a PhD in psychology. At Howard University, Sumner created a highly influential training center for African American psychologists. His students included Kenneth B. Clark, whose research influenced the *Brown v. Board of Education* decision, which ended the legal basis for segregated education. Clark went on to become the first African American president of the APA.

Once launched, functionalism was centered at the University of Chicago and Columbia University. Dewey's "The Reflex Arc Concept in Psychology" is thought by many to mark the formal beginning of the school of functionalism. During his 25 years as department chairman at Chicago, Angell encouraged the growth of functional psychology. Carr was another who furthered the development of functional psychology at Chicago. A key figure in Columbia University's brand of functionalism, it was Cattell who encouraged psychologists to study a wide variety of topics using a wide variety of methodologies and to emphasize the practical value of

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psychological principles. Another leading figure at Columbia was Woodworth, whose dynamic psychology focused on motivation.

Perhaps the most influential Columbia functionalist was Thorndike. Thorndike's goal was to study animal behavior objectively because Darwin's theory had shown that there were only quantitative differences between humans and other animals. Romanes did rudimentary animal research, but his observations were riddled with anecdotes attributing higher, human thought processes to nonhuman animals. Morgan's animal work was better because he applied the principle that came to be called Morgan's canon: No animal action should be explained on a higher level (reflective, rational thought) if it can be explained on a lower level (a simple intention or purpose). Morgan's canon was used to discount the anecdotal evidence that Romanes and others had offered. Washburn, one of several women who played a role in the rise of U.S. psychology, used animal behavior generated under controlled conditions to infer the mental processes utilized by nonhuman animals. Although overcoming the restrictions of naturalistic observation, her primary goal was to understand animal consciousness.

Comparative animal psychology flourished under functionalism. For example, Thorndike studied animal behavior under controlled conditions, but his research vastly reduced the importance of consciousness, both human and nonhuman. From his research using the puzzle box, Thorndike concluded that learning occurs gradually rather than all at once, that learning occurs without the involvement of mental processes, and that the same principles of learning apply to all mammals, including humans. Because Thorndike was interested in how the strength of the neural bonds or connections between stimuli and responses varies with experience, his theory is often referred to as connectionism.

Thorndike summarized many of his observations with his famous laws of exercise and effect. In 1929, Thorndike revised his theory by discarding the law of exercise and salvaging only the half of the law of effect that said positive consequences strengthen an association. Thorndike had a tremendous impact on pedagogy in the American schools. Many of Thorndike's ideas are found in the contemporary work of Skinnerians.

This chapter covered all of the figures considered the most important contributors to American psychology in 1903, including James Mark Baldwin whose ideas influenced Piaget. Unlike structuralism, which faded away as a school because most of its findings and methodologies were rejected, functionalism lost its distinctiveness as a school because most of its major tenets were assimilated into all forms of psychology.

DISCUSSION QUESTIONS

1. Briefly describe the four stages of U.S. psychology.
2. What are the major themes that characterized functionalistic psychology?
3. What was the personal crisis that James experienced, and how did he resolve it?
4. Define pragmatism.
5. For James, what are the major characteristics of consciousness?
6. How, according to James, did habits develop? What advice did he give for developing good habits?
7. How did James distinguish between the empirical self and the self as knower? Include in your answer a definition of the material self, the social self, and the spiritual self.
8. What did James mean by *self-esteem*? What, according to James, could be done to enhance one's self-esteem?
9. Summarize the James–Lange theory of emotion. How, according to James, could one escape or avoid negative emotions such as depression?
10. What, according to James, are the important differences between tender-minded and

tough-minded individuals? How did he suggest pragmatism could be used to resolve the differences between the two types of individuals?

11. Summarize Münsterberg's work in clinical, forensic, and industrial psychology.
12. Describe the difficulties that Calkins had in attaining her graduate school education. Summarize her accomplishments in spite of these difficulties.
13. Discuss Hall's contributions to developmental psychology.
14. Give several examples of an interest in religion by early U.S. psychologists.
15. Why was Hall opposed to coeducation at the secondary and college levels?
16. Why were the views of women held by Titchener, Münsterberg, and Hall considered paradoxical?
17. In what areas is Hall thought to be an important "first?"
18. Summarize Kenneth B. Clark's efforts to bring about racial equality in the United States and indicate why his efforts were controversial.
19. What was Dewey's criticism of the analysis of behavior in terms of reflexes? What did he propose instead? What part did Dewey's work play in the development of functionalism?
20. In his address "The Province of Functional Psychology," what important distinctions did Angell make between structuralism and functionalism?
21. What did Carr mean by an adaptive act? How did Carr contribute to the development of functionalism?
22. Discuss Cattell's approach to functional psychology at Columbia.
23. Why was Woodworth's approach to psychology called dynamic psychology? Why did he prefer an S–O–R explanation of behavior over an S–R explanation?
24. What was Morgan's canon, and why did he propose it?
25. What was Washburn's primary goal in studying animal behavior? In what way was her approach an improvement over those of Romanes and Morgan?
26. What major conclusions did Thorndike reach concerning the nature of the learning process? Why was Thorndike's theory referred to as connectionism?
27. Describe Thorndike's laws of exercise and effect before and after 1929.
28. Explain why Thorndike is viewed as a transitional figure between the schools of functionalism and behaviorism.
29. What are some of the enduring accomplishments of James Mark Baldwin?
30. What was functionalism's fate?

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GLOSSARY

Adaptive act Carr's term for a unit of behavior with three characteristics: a need, an environmental setting, and a response that satisfies the need.

Angell, James Rowland (1869–1949) As president of the American Psychological Association and as chairman of the psychology department at the University of Chicago for 25 years, did much to promote functionalism.

Applied psychology Psychology that is useful in solving practical problems. The structuralists opposed such practicality, but Münsterberg and, later, the functionalists emphasized it.

Baldwin, James Mark (1861–1934) Founded several psychology programs, including the first in Canada. Did important early work in social psychology, cognitive development, and linking psychology with evolution. He served as APA president, but was disgraced by scandal.

Calkins, Mary Whiton (1863–1930) Although satisfying all the requirements for a PhD at Harvard, she was denied the degree because she was a woman. In spite of such restrictions, Calkins made significant contributions to the study of verbal learning and memory and to self-psychology. Her many honors included being elected the first female president of the American Psychological Association in 1905.

Carr, Harvey (1873–1954) An early functionalistic psychologist at the University of Chicago.

Cattell, James McKeen (1860–1944) Represented functionalistic psychology at Columbia University. He did much to promote applied psychology.

Clark, Kenneth Bancroft (1914–2005) Along with his colleagues, conducted research that demonstrated the negative effects of segregation of children. A portion of this research was cited in the 1954 Supreme Court decision that ended the legal basis for segregated education in the United States. Clark went on to become the first African American president of the APA in 1970.

Connectionism The term often used to describe Thorndike's theory of learning because of its concern with the neural bonds or connections that associate sense impressions and impulses to action.

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Dewey, John (1859–1952) A key person in the development of functionalism. Some mark the formal beginning of the school of functionalism with the 1896 publication of Dewey's article "The Reflex Arc Concept in Psychology."

Dynamic psychology The brand of psychology suggested by Woodworth that stressed the internal variables that motivate organisms to act.

Empirical self According to James, the self that consists of everything a person can call his or her own. The empirical self consists of the material self (all of one's material possessions), the social self (one's self as known by others), and the spiritual self (all of which a person is conscious).

Forensic psychology The application of psychological principles to legal matters. Münsterberg is considered the first forensic psychologist.

Functionalism Under the influence of Darwin, the school of functionalism stressed the role of consciousness and behavior in adapting to the environment.

Habits Those learned patterns of behavior that James and others believed were vital for the functioning of society.

Hall, Granville Stanley (1844–1924) Created the first U.S. experimental psychology laboratory, founded and became the first president of the American Psychological Association, and invited Freud to Clark University to give a series of lectures. Hall thus helped psychoanalysis receive international recognition. Many of the beliefs contained in his two-volume book on adolescence are now considered incorrect. Nonetheless, that work is currently seen as an important pioneering effort in educational, child, and adolescent psychology and in parent education and child welfare programs.

Identical elements theory of transfer Thorndike's contention that the extent to which learning transfers from one situation to another is determined by the similarity between the two situations.

Ideo-motor theory of behavior According to James, ideas cause behavior, and thus we can control our behavior by controlling our ideas.

Industrial psychology The application of psychological principles to such matters as personnel selection; increasing employee productivity; equipment design; and marketing, advertising, and packaging of products. Münsterberg is usually considered the first industrial psychologist.

James, William (1842–1910) Was instrumental in the founding of functionalistic psychology. James emphasized the function of both consciousness and behavior. For him the only valid criterion for evaluating a theory, thought, or act is whether it works. In keeping with his pragmatism, he claimed that psychology needs to employ both scientific and nonscientific procedures. Similarly, on the individual level, sometimes one must believe in free will and at other times in determinism.

James–Lange theory of emotion The theory that people first respond and then have an emotional experience. For example, we run first, and then we are frightened. An implication of the theory is that we should act according to the way we want to feel.

Lange, Carl George (1834–1900) Along with James, proposed the theory that a person's emotional experience follows his or her behavior.

Law of effect Thorndike's contention that reward strengthens associations, whereas punishment weakens them. Later, Thorndike revised the law to state that reward strengthens associations, but punishment has no effect on them.

Law of exercise Thorndike's contention that the strength of an association varied with the frequency of the association's use. Thorndike discarded this law in 1929.

Morgan, Conwy Lloyd (1852–1936) An early comparative psychologist who believed that there is a gradation of consciousness among animal species. To infer the cognitive processes used by various animals, he observed their naturally occurring behavior.

Morgan's canon The insistence that explanations of animal behavior be kept as simple as possible. One should never attribute higher mental activities to an animal if lower mental activities are adequate to explain its behavior.

Münsterberg, Hugo (1863–1916) Stressed the application of psychological principles in such areas as clinical, forensic, and industrial psychology. In so doing, Münsterberg created applied psychology.

Paired-associate technique The still widely used method of investigating verbal learning invented by Calkins. Pairs of stimulus material are first presented to subjects and then, after several exposures, only one member of the pair is presented and the subject is asked to recall the second.

Pragmatism The belief that usefulness is the best criterion for determining the validity of an idea.

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Puzzle box The experimental chamber Thorndike used for systematically studying animal behavior.

Recapitulation theory Hall's contention that all stages of human evolution are reflected in the life of an individual.

Reciprocal antagonism Münsterberg's method of treating mentally disturbed individuals, whereby he would strengthen thoughts antagonistic to those causing a problem.

Romanes, George John (1848–1894) One of the first to follow Darwin's lead and study animal behavior. Romanes's research was very subjective, however, and relied heavily on anecdotal evidence.

Self as knower According to James, the pure ego that accounts for a person's awareness of his or her empirical self.

Self-esteem According to James, how a person feels about himself or herself based on the ratio of successes to attempts. One can increase self-esteem either by accomplishing more or attempting less.

Stream of consciousness Term for the way James thought the mind worked. James described the mind as consisting of an ever-changing stream of interrelated, purposive thoughts rather than static elements that could be isolated from one another, as the structuralists had suggested.

Sumner, Francis Cecil (1895–1954) In 1920, under the supervision of Hall, became the first African American to obtain a PhD in psychology. Later, under Sumner's leadership, Howard University became a highly influential training center for African American psychologists.

Thorndike, Edward Lee (1874–1949) Marks the transition between the schools of functionalism and behaviorism. Thorndike concluded from his objective animal research that learning occurs gradually, occurs independent of consciousness, and is the same for all mammals. His final theory of learning was that practice alone has no effect on an association (neural bond) and that positive consequences strengthen an association but negative consequences do not weaken it.

Washburn, Margaret Floy (1871–1939) First woman to attain a doctorate in psychology and second female president of the APA (1921). She made significant contributions to comparative psychology by studying animal behavior under controlled conditions before inferring the mental attributes necessary to explain the observed behavior.

Woodworth, Robert Sessions (1869–1962) An influential functionalist at Columbia University who emphasized the role of motivation in behavior.

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12

Behaviorism

Seldom, if ever, does a major development in psychology result from the work of one person. This is not to say that single individuals have not been important, but such importance often lies in their ability to culminate or synthesize previous work. The founding of the school of **behaviorism** is a clear example. Although John B. Watson is usually given credit for founding behaviorism, we will see that much of his thinking was "in the air." Objective psychology (psychology that insists on studying only those things that are directly measurable) was already well developed in Russia before the onset of behaviorism in the United States and several functionalists were making statements very close to those Watson later made.

As we saw in the preceding chapter, some functionalists were impressed by how much could be learned about humans without the use of introspection, and they began to drift toward what was later called the behavioristic position. One such functionalist was James McKeen Cattell, whom we encountered in the last two chapters. A full nine years before Watson's "official" founding of behaviorism, Cattell (1904) said this about psychology:

> I am not convinced that psychology should be limited to the study of consciousness.… The rather wide-spread notion that there is no psychology apart from introspection is refuted by the brute argument of accomplished fact.
>
> It seems to me that most of the research work that has been done by me or in my laboratory is nearly as independent of introspection as work in physics or in zoology. The time of mental processes, the accuracy of perception and movement, the range of consciousness, fatigue and practise, the motor accompaniments of thought, memory, the

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> association of ideas, the perception of space, color-vision, preferences, judgments, individual differences, the behavior of animals and children, these and other topics I have investigated without requiring the slightest introspection on the part of the subject or undertaking such on my own part during the course of the experiments.… It is certainly difficult to penetrate by analogy into the consciousness of the lower animals, of savages, and of children, but the study of their behavior has already yielded much and promises much more. (pp. 179–184)

Cattell's statement is clearly within the functionalistic framework because it stresses the study of both consciousness and behavior and emphasizes the practicality of knowledge; but it also stresses that *much* important information can be attained without the use of introspection.

The APA President in 1910, Walter Pillsbury, provided another example of the Zeitgeist:

> Psychology has been defined as the "science of consciousness" or as the "science of experience subjectively regarded." Each of these definitions has advantages, but none is free from objection.… Mind is known from man's activities. *Psychology may be most satisfactorily defined as the science of human behavior.*
>
> Man may be treated as objectively as any physical phenomenon. He may be regarded only with reference to what he does. Viewed in this way the end of our science is to understand human action. (1911, pp. 1–2)

As another example, Thorndike was discovering how the laws of learning that were derived from work on nonhumans applied to humans. The success of animal researchers such as Thorndike created a strain between them and the prominent psychologists who insisted that psychology concentrate on introspective data. This strain between the animal researchers and the introspectionists created the atmosphere in which behaviorism took on revolutionary characteristics.

As we will see, John B. Watson was one of these animal researchers. However, before we consider Watson, we should review the work of the Russians, work that preceded and was similar in spirit to Watson's behaviorism.

RUSSIAN OBJECTIVE PSYCHOLOGY

Ivan Sechenov

The founder of Russian objective psychology, **Ivan M. Sechenov (1829–1905)**, started out studying engineering (at age 14) but switched to medicine at the University of Moscow, where he received his MD. As part of his postgraduate training, he studied with Johannes Müller, Emil Du Bois-Reymond, and Hermann von Helmholtz in Berlin. During this time he was also influenced by the evolutionary thought of Spencer and Darwin. Sechenov's academic career began with an appointment at the Military Medical Academy at St. Petersburg and ended at the University of Moscow.

Influenced by the writings of La Mettrie (Chapter 5) and the Berlin physiologists' positivism, Sechenov sought to explain all psychic phenomena on the basis of associationism and materialism, strongly denying that thoughts cause behavior. Rather, he insisted that external stimulation causes *all* behavior:

> Since the succession of two acts is usually regarded as an indication of their causal relationship … *thought is generally regarded as the cause of action*. When the external influence, i.e., the sensory stimulus,

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Ivan M. Sechenov

> remains unnoticed—which occurs very often—*thought is even accepted as the initial cause of action.* Add to this the strongly pronounced subjective nature of thought, and you will realize how firmly man must believe in the voice of self-consciousness when it tells him such things. But actually this is the greatest of falsehoods: *the initial cause of any action always lies in external sensory stimulation, because without this thought is inconceivable.* (Sechenov, 1863/1965, pp. 88–89)

Sechenov did not deny consciousness or its importance, but he insisted that there was nothing mysterious about it and sought to explain it in terms of physiological processes triggered by external events. For Sechenov, both overt behavior and mental processes are reflexive in the sense that they are both triggered by external stimulation filtered through physiological processes in the brain.

Inhibition. The most important concept that Sechenov introduced in *Reflexes of the Brain* (1863/1965) was that of **inhibition**. It was Sechenov's discovery of inhibitory mechanisms in the brain that caused him to conclude that psychology could be studied in terms of physiology. In fact, before the title was changed by a St. Petersburg censor, *Reflexes of the Brain* was originally called *An Attempt to Bring Physiological Bases into Mental Processes* (Boakes, 1984). In 1845 Eduard Weber (brother of Ernst Weber, Chapter 8) discovered that if he stimulated a frog's vagus nerve (a major nerve linking the brain to various internal organs), the frog's heart would beat *slower*. This was the first observation that increased activity (stimulation) of one part of the neuromuscular system caused decreased activity in another. He also observed that spinal reflexes are often more sluggish in animals whose cerebral cortices are intact than for animals whose cortices had been ablated. Weber speculated that one cortical function may be to inhibit reflexive behavior.

Weber's observations and insights went largely unnoticed except for Sechenov, who saw in them a possible explanation for why we often have voluntary control over what is ordinarily involuntary behavior. For example, we can sometimes suppress or delay an impulse to sneeze or to cough. Sechenov also saw in inhibition an explanation for smooth, coordinated movement without the need to employ subjective, metaphysical concepts such as mind or soul. In other words, he could explain so-called volition and purposive behavior and still remain objective.

Using frogs as subjects, Sechenov found that he could inhibit the reflexive withdrawal of a leg from an acid solution by placing salt crystals in certain areas of the brain. When the salt was washed away with water, the reflex returned at full force. Although Sechenov found that the frog's inhibitory centers were in places other than where Weber speculated they were, he still confirmed that certain brain centers, when stimulated, would inhibit reflexive behavior. Sechenov's observation solved a problem that had restricted attempts to explain behavior in terms of reflexes: Why is there often a discrepancy between the intensity of a stimulus and the intensity of the response it elicits? It had been observed, for example, that a stimulus of very low intensity could produce a very intense response, and a very intense stimulus could produce only a slight response. Sechenov's answer was that sometimes a response to a stimulus is partially or even completely inhibited, and sometimes it is not. With this major obstacle out of the way, it was now possible, according to Sechenov, to explain all behavior, including human behavior, as reflexive. Sechenov saw human development as the slow establishment of inhibitory control over reflexive behavior. Such control allows contemplative action or inaction and the quiet endurance of aversive experience. In other words, Sechenov postulated a mechanism by which prior experience could influence present experience and behavior:

> Hence a new and extremely important addition was made to the theory of reflexes. They were now regarded as directly related, not only to present stimuli, but also to the sum total of previous influences leaving their impression on the nervous system. (Yaroshevski, 1968, p. 91)

In *Reflexes*, Sechenov attempted to explain all behavior in terms of the excitation or inhibition of reflexes. It should be noted, however, that by *reflex* Sechenov meant only that every muscle movement is caused by an event that preceded it. Thus, he rejected the idea of spontaneous or unelicited behavior.

Psychology as Physiology. Sechenov strongly believed that the traditional approach to understanding psychological phenomena using introspective analysis had led nowhere. For Sechenov (1935/1973), the only valid approach to the study of psychology involves the objective methods of physiology:

> Physiology will begin by separating psychological reality from the mass of psychological fiction which even now fills the human mind. Strictly adhering to the principle of induction, physiology will begin with a detailed study of the more simple aspects of psychical life and will not rush at once into the sphere of the highest psychological phenomena. Its progress will therefore lose in rapidity, but it will gain in reliability. As an experimental science, physiology will not raise to the rank of incontrovertible truth anything that cannot be confirmed by exact experiments; this will draw a sharp boundary-line between hypothesis and positive knowledge. Psychology will thereby lose its brilliant universal theories; there will appear tremendous gaps in its supply of scientific data; many explanations will give place to a laconic "we do not know." … And yet, psychology will gain enormously, for it will be based in scientifically verifiable facts instead of the deceptive suggestions of the voice of our consciousness. Its generalizations and conclusions will be limited to actually existing analogies, they will not be subject to the influence of the personal preferences of the investigator which have so often led psychology to absurd transcendentalism, and they shall thereby become really objective scientific hypotheses. The subjective, the arbitrary and the fantastic will give way to a nearer or more remote approach to truth. In a word, *psychology will become a positive science. Only physiology can do this, for only physiology holds the key to the scientific analysis of psychical phenomena.* (pp. 350–351)

Although Sechenov never enjoyed much support from his country's government or from his colleagues during his lifetime, he did influence the next generation of neurophysiologists. After him, the study of inhibition became central, it was widely accepted that the best way to study psychological phenomena was by using the objective methods of physiology, and it was generally believed that behavior is best understood as reflexive.

Ivan Petrovich Pavlov

Ivan Petrovich Pavlov (1849–1936) was born in the town of Ryazan, about 250 miles from Moscow. His father was first a teacher of classical

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languages (Greek and Latin) and later a priest. Pavlov's two paternal uncles were also priests, but they were rather unruly: "Both were often disciplined by the Church authorities for their disorderly behavior and their penchant for the bottle" (Windholz, 1991, p. 52). Indeed, the younger uncle, although once popular with the clergy, was eventually defrocked because of his practical jokes. Pavlov's mother was also the daughter of a priest, and Pavlov remembered her fondly but "thought that she mistook overprotectiveness for love" (Windholz, p. 55).

At the age of 10, Pavlov suffered a severe fall, which delayed his entering high school for a year. During his convalescence, he spent considerable time with his godfather, an abbot of a monastery near Ryazan. His godfather's lack of concern for worldly matters and his attention to detail were to have a lifelong influence on Pavlov. Eventually, Pavlov enrolled in the local ecclesiastical high school and then in the Ryazan Theological Seminary where he studied for the priesthood. However, in 1870, at the age of 21, he changed his mind and enrolled in the Military Medical Academy at St. Petersburg, where he pursued natural science. Pavlov walked the several hundred miles from Ryazan to St. Petersburg, and his arrival there was coincidental with Sechenov's departure. It was under Sechenov's successor, Elias Cyon, that Pavlov first studied physiology.

Pavlov obtained a degree in natural science in 1879 and then remained at the academy to pursue a degree in medicine. Pavlov was so impressive as a medical student that he was appointed director of a small laboratory, where he helped several students obtain their doctorates even before he obtained his own in 1883. After receiving his medical degree, Pavlov studied physiology in Germany for two years. During this time, he worked with Carl Ludwig at the University of Leipzig. We saw in Chapter 8 that Ludwig, along with Helmholtz, Du Bois-Reymond, and Brucke, had signed an oath committing himself to a materialistic science devoid of metaphysical speculation. This positivism was to have a lasting effect on Pavlov: "Pavlov believed that facts were more important than theories because facts could stand on their own merit, whereas theories were constructs that could be easily proposed and just as well rejected" (Windholz, 1990, p. 69). Upon returning to Russia, Pavlov held a variety of ill-paying jobs until 1890, when he was finally appointed professor of physiology at St. Petersburg's Military Medical Academy. Pavlov was 41 at the time.

Sechenov, like Hartley and Bain before him, had suggested that psychology should be studied using physiological concepts and techniques. Pavlov agreed with him completely and went a step further. Unlike Sechenov, Pavlov actually demonstrated in detail how such study could take place. Also unlike Sechenov, Pavlov came to be highly regarded both by the government and (most of) his colleagues. In 1921 Lenin bestowed many special privileges on Pavlov and proclaimed him a Hero of the Revolution. All this came rather late in Pavlov's life, however. Before he developed his interest in psychology, he first spent many years studying the digestive system.

Research on Digestion. During his first 10 years at St. Petersburg, Pavlov pursued his interests in the digestive system. At this time, most of what was known about digestion came from studies in which animals had been operated on to expose the organs of interest. Often the experimental animals were already dead as their organs were investigated; and if not dead, they were at least traumatized by the operation. Noting that little could be learned about normal digestive functioning by studying dead or traumatized animals, Pavlov sought a more effective experimental procedure. He knew of someone who had suffered a severe gunshot wound to the stomach and recovered. The victim's treatment, however, had left an open hole in his body through which his internal organs could be observed. The grateful patient allowed his physician to observe his internal processes, including those of the digestive system. Although this particular case lacked scientific control, it gave Pavlov an idea. Using the latest antiseptic surgical

Pavlov operating on an experimental animal.

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techniques and his outstanding surgical skills, Pavlov prepared a gastric fistula—a channel—leading from a dog's digestive organs to outside the dog's body. Such a procedure allowed the animal to recover fully from surgical trauma before its digestive processes were investigated. Pavlov performed hundreds of experiments to determine how the amount of secretion through the fistula varied as a function of different types of stimulation to the digestive system, and his pioneering research won him the 1904 Nobel Prize in physiology.

The Conditioned Reflex. During his work on digestion, Pavlov discovered the **conditioned reflex**. As mentioned, Pavlov's method of studying digestion involved a surgical arrangement that allowed the dog's gastric juices to flow out of the body and be collected. While studying the secretion of gastric juices in response to such substances as meat powder, Pavlov noticed that objects or events associated with meat powder also caused stomach secretions—for example, the mere sight of the experimenter or the sound of his or her footsteps. Pavlov referred to these latter responses as conditional because they depended on something else—for example, meat powder. In an early translation of Pavlov's work, *conditional* was translated as *conditioned*, and the latter term has been used ever since. In light of subsequent history, it is interesting to note that the initial announcement of the discovery of the conditioned reflex received little attention:

> Pavlov's initial reference to conditional reflexes was made in an 1899 address before the Society of Russian Doctors of St. Petersburg. The address, delivered to a local group, failed to receive wide attention. His work, however, became internationally known when on 12 December 1904, in his Nobel Prize address, Pavlov mentioned the phenomenon of conditioning while describing his research on digestive processes. (Windholz, 1983, p. 394)

Pavlov realized that conditioned reflexes could be explained by the associative principles of contiguity and frequency. He also realized that by studying conditioned reflexes, which he had originally called "psychic reflexes," he would be entering the realm of psychology. Like Sechenov before him, Pavlov had a low opinion of psychology with its prevailing use of introspection. He resisted the study of conditioned reflexes for a long time because of their apparently subjective nature. After pondering Sechenov's work, however, he concluded that conditioned reflexes, like natural reflexes, could be explained in terms of the neural circuitry and the physiology of the brain. At the age of 50, Pavlov began studying the conditioned reflex. His work would continue for 30 years.

Pavlov's Personality. Like Sechenov, Pavlov was a positivist and was totally dedicated to his laboratory work. He edited no journals, engaged in no committee work, and actually wrote relatively little. His two books were edited versions of lectures he had given. The first, *Work of the Principal Digestive*

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Glands (1897), contained only a brief reference to "psychic secretions," and the second, *Conditioned Reflexes* (English translation, 1927/1960), dealt exclusively with the topic. Most of the information concerning Pavlov's work is found in the dissertations of doctoral students whose work he supervised. In fact, the first formal research on the conditioned reflex was performed by Pavlov's student Stefan Wolfsohn in 1897. His students viewed Pavlov as hard but fair, and they were very fond of him. Pavlov encouraged both women and Jewish students to study in his laboratory, a practice uncommon at the time. One thing for which Pavlov had no tolerance, however, was mentalism. If researchers in his laboratory used mentalistic terminology to describe their findings, he fined them. Fancher (1990) describes how Pavlov ran his laboratory:

> In pursuing his research he overlooked no detail. While he uncomplainingly lived frugally at home, he fought ferociously to ensure his laboratory was well equipped and his experimental animals well fed. Punctual in his arrival at the lab and perfectionistic in his experimental technique, he expected the same from his workers. Once during the Russian Revolution he disciplined a worker who showed up late from having to dodge bullets and street skirmishes on the way to the laboratory. (p. 279)

In private life, however, Pavlov was a completely different person. Fancher (1990) gives the following account of Pavlov outside the laboratory:

> Outside, he was sentimental, impractical, and absent-minded—often arousing the wonder and amusement of his friends. He became engaged while still a student, and lavished much of his meager income on extravagant luxuries such as candy, flowers, and theater tickets for his fiancee. Only once did he buy her a practical gift, a new pair of shoes to take on a trip. When she arrived at her destination she found only one shoe in her trunk, accompanied by a letter from Pavlov: "Don't look for your other shoe. I took it as a remembrance of you and have put it on my desk." Following marriage, Pavlov often forgot to pick up his pay, and once when he did remember he immediately loaned it all to an irresponsible acquaintance who could not pay it back. On a trip to New York he carried all of his money in a conspicuous wad protruding from his pocket; when he entered the subway at rush hour, the predictable felony ensued and his American hosts had to take up a collection to replace his funds. (p. 279)

During the early years of their marriage, Pavlov and his wife lived in poverty. Once, some relief appeared forthcoming when a few of Pavlov's colleagues managed to raise a small amount of money to pay him for giving a few lectures. However, Pavlov used the money to purchase additional laboratory animals (Boakes, 1984). Pavlov's wife tolerated the situation, and she continued to give Pavlov her complete support during their long marriage:

> What sustained Sara was belief in her husband's genius and in the supreme value of his work. In the early years of marriage they agreed upon a pact which both were to keep for the rest of their long life together. If she was to devote herself entirely to his welfare so that there would be nothing to distract him from his scientific work, then he was to regulate his life accordingly; she made him promise to abstain from all forms of alcohol, to avoid card games and to restrict social events to visits from friends on Saturday evenings and entertainment, in the form of concerts or the theatre, to Sunday evenings. (Boakes, 1984, p. 116)

On rare occasions, Pavlov did demonstrate a concern for practical economics. For example, when his laboratory animals were producing an abundance of saliva, he sold it to the townspeople:

> For some years gastric juice became very popular around St. Petersburg as a remedy

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> for certain stomach complaints. As Pavlov was able to supply gastric juice in relatively large quantities and of a particularly pure quality by using the sham feeding preparation, the proceeds from its sale became considerable, to the extent of almost doubling the laboratory's income when this already far surpassed that of any comparable Russian laboratory. (Boakes, 1984, p. 119)

Unconditioned and Conditioned Reflexes. According to Pavlov, organisms respond to the environment in terms of unconditioned and conditioned reflexes. An **unconditioned reflex** is innate and is triggered by an **unconditioned stimulus (US)**. For example, placing food powder in a hungry dog's mouth will increase the dog's saliva flow. The food powder is the unconditioned stimulus, and the increased salivation is the **unconditioned response (UR)**. The connection between the two is determined by the biology of the organism. A conditioned reflex is derived from experience in accordance with the laws of contiguity and frequency. Before Pavlov's experiment, stimuli such as the *sight* of food powder, the sight of the attendant, and the sound of the attendant's footsteps were biologically neutral in the sense that they did not automatically elicit a specific response from the dogs. Because of its contiguity with an unconditioned stimulus (in this case, food), this previously neutral stimulus developed the capacity to elicit some fraction of the unconditioned response (in this case, salivation), becoming now a **conditioned stimulus (CS)**. When a previously neutral stimulus (now a conditioned stimulus) elicits some fraction of an unconditioned response, the reaction is called a **conditioned response (CR)**. Thus, a dog salivating to the sound of an attendant's footsteps exemplifies a conditioned response as shown below.

Food (unconditioned stimulus) → Salivation (unconditioned response)
Footsteps (neutral stimulus) + Food (unconditioned stimulus) → Salivation (unconditioned response)
Footsteps (conditioned stimulus) → Salivation (conditioned response)

Through this process of conditioning, the stimuli governing an organism's behavior are gradually increased from a few unconditioned stimuli to countless other stimuli that become associated to unconditioned stimuli through contiguity.

Excitation and Inhibition. Showing the influence of Sechenov, Pavlov believed that all central nervous system activity can be characterized as either **excitation** or inhibition. Like Sechenov, Pavlov believed that all behavior is reflexive, that is, caused by antecedent stimulation. If not modified by inhibition, unconditioned stimuli and conditioned stimuli will elicit unconditioned and conditioned reflexes, respectively. However, through experience, organisms learn to inhibit reflexive behavior. We will see one example of learned inhibition when we consider extinction. The important point here is that we are constantly experiencing a wide array of stimuli, some of them tending to elicit behavior and some tending to inhibit behavior. These two "fundamental processes" are always present, and how an organism behaves at any given moment depends on their interaction. The pattern of excitation and inhibition that characterizes the brain at any given moment is what Pavlov called the **cortical mosaic**. The cortical mosaic determines how an organism will respond to its environment at any given time.

If a conditioned stimulus is continually presented to an organism and is no longer followed by an unconditioned stimulus, the conditioned response will gradually diminish and finally disappear, at which point **extinction** is said to have occurred. If a period of time is allowed to elapse after extinction and the conditioned stimulus is again presented, the stimulus will elicit a conditioned response. This is called **spontaneous recovery**. For example, if a tone (CS) is consistently followed by the presentation of food powder (US), an organism will eventually salivate when the tone alone is presented (CR). If the tone is then presented but not followed by the food powder,

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the magnitude of the conditioned response will gradually diminish, and finally the tone will no longer elicit a conditioned response (extinction). After a delay, however—even without any further pairing of the tone and food powder—the tone will again elicit a conditioned response (spontaneous recovery).

Pavlov believed that spontaneous recovery demonstrated that the extinction process does not eliminate a conditioned response but merely inhibits it. That is, presenting the conditioned stimulus without the unconditioned stimulus causes the animal to inhibit the conditioned response. Further evidence that extinction is best explained as an inhibitory process is provided by **disinhibition**. This phenomenon is demonstrated when, after extinction has taken place, presenting a strong, irrelevant stimulus to the animal causes the conditioned response to return. The assumption was that the fear caused by the strong stimulus displaces the inhibitory process, thus allowing the return of the conditioned response.

Experimental Neurosis. Let us say that showing a dog a circle is always followed by food and showing a dog an ellipse is never followed by food. According to Pavlov, the circle will come to elicit salivation, and the ellipse will inhibit salivation. Now let us make the circle increasingly more elliptical. What happens? According to Pavlov, when the circle and the ellipse become indistinguishable, the excitatory and the inhibitory tendencies will conflict, and the animal's behavior will break down. Because this deterioration of behavior was brought about in the laboratory, it was called **experimental neurosis**.

Almost as interesting as the fact that abnormal behavior could be produced in the laboratory by producing conflicting tendencies was the fact that the "neurotic" behavior took different forms in different animals. Some dogs responded to the conflict by becoming highly irritable, barking violently, and tearing at the apparatus with their teeth. Other animals responded to the conflict by becoming depressed and timid. Observations such as these caused Pavlov to classify animals in terms of different types of nervous systems. He thought that there are four types of animals: those for whom the excitatory tendency is very strong, those for whom the excitatory tendency is moderately strong, those for whom the inhibitory tendency is very strong, and those for whom the inhibitory tendency is moderately strong. Thus, how animals, including humans, respond to conflict is to a large extent determined by the type of nervous system they possess. In his later years, Pavlov speculated that much human abnormal behavior was caused by a breakdown of inhibitory processes in the brain. Indeed, Pavlov's work on conflict and his typology of nervous systems were to strongly influence subsequent work on abnormal behavior, conflict, frustration, and aggression.

The First- and Second-Signal Systems. According to Pavlov, all tendencies that animals acquire during their lifetimes are based on innate, biological processes—that is, on unconditioned stimuli and unconditioned responses that have been acquired during their phylogenetic history. These innate processes are expanded by conditioning. As biologically neutral stimuli (CSs) are consistently associated with biologically significant stimuli (USs), the former come to *signal* the biologically significant events. The adaptive significance of such signals should be obvious; if an animal is warned that something either conducive or threatening to survival is about to happen, it will have time to engage in appropriate behavior.

> Pavlov … rated very highly the ability of the conditioned reaction to act as a "signal" reaction or, as he expressed it many times, a reaction of "warning character." It is this "warning" character which accounts for the profound historical significance of the conditioned reflex. It enables the animal to adapt itself to events which are not taking place at that particular moment but which will follow in the future. (Anokhin, 1968, p. 140)

Pavlov called the stimuli (CSs) that come to signal biologically significant events the **first-signal system**, or "the first signals of reality." However, humans also learn to respond to *symbols* of physical events. For example, we learn to respond to the shouted word *fire* just as we would to the sight of a fire. Pavlov referred to the words that come to symbolize reality as "signals of signals," or the **second-signal system**. Language, then, consists of symbols of environmental and bodily experiences. Once established, these symbols can be organized into abstract concepts that guide our behavior because even these abstract symbols represent events in the physical world:

> Obviously for man speech provides conditioned stimuli which are just as real as any other stimuli. At the same time speech provides stimuli which exceed in richness and many-sidedness any of the others, allowing comparison neither qualitatively nor quantitatively with any conditioned stimuli which are possible in animals. Speech, on account of the whole preceding life of the adult, is connected up with all the internal and external stimuli which can reach the cortex, signalling all of them and replacing all of them, and therefore it can call forth all those reactions of the organism which are normally determined by the actual stimuli themselves. (Pavlov, 1927/1960, p. 407)

Pavlov's Attitude toward Psychology. Although Pavlov had a low opinion of most psychologists, he did like Thorndike. In the following passage, Pavlov (1928) even acknowledges Thorndike as the first to do systematic, objective research on the learning process in animals:

> Some years after the beginning of the work with our new method I learned that somewhat similar experiments on animals had been performed in America, and indeed not by physiologists but by psychologists. Thereupon I studied in more detail the American publications, and now I must acknowledge that the honour of having made the first steps along this path belongs to E. L. Thorndike. By two or three years his experiments preceded ours, and his book must be considered as a classic, both for its bold outlook on an immense task and for the accuracy of its results. (pp. 38–40)

Pavlov believed that he had discovered the physiological mechanism for explaining the associationism that philosophers had been discussing for centuries. He believed that by showing the physiological underpinnings of association, he had put associationism on an objective footing and that speculation about how ideas become associated with each other could finally end. For Pavlov (1955), the temporary connections formed by conditioning were precisely the associations that had been the focus of philosophical and psychological speculation:

> Are there any grounds … for distinguishing between that which the physiologist calls the temporary connection and that which the psychologist terms association? They are fully identical; they merge and absorb each other. Psychologists themselves seem to recognize this, since they (at least, some of them) have stated that the experiments with conditioned reflexes provide a solid foundation for associative psychology, i.e., psychology which regards association as the base of psychical activity. (p. 251)

Pavlov died of pneumonia on February 27, 1936, at the age of 87. The entire September 1997 issue of *American Psychologist* explores the life, works, and influence of Pavlov.

Vladimir Bechterev

At 16 years of age, **Vladimir Bechterev (1857–1927)** entered the Military Medical Academy at St. Petersburg, where Sechenov had studied and Pavlov was studying. He graduated in 1878 (one year before Pavlov) but continued on in the Department of Mental and Nervous Diseases until he also obtained his doctorate in 1881. He then studied with Wundt in Leipzig, Du Bois-Reymond in Berlin, and Charcot (the famous French psychiatrist we will meet in Chapter 15) in Paris. In 1885 he returned to Russia to a position at the University of Kazan, where he created the first Russian experimental psychology laboratory. In 1893 he returned to St. Petersburg's Military Medical Academy, where he held a chair

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Courtesy of the National Library of Medicine

Vladimir M. Bechterev

in the Psychic and Nervous Diseases Department. In 1904 he published an important paper titled "Objective Psychology," which evolved into a three-volume book by the same name (1907–1912; French translation, 1913). Like Sechenov and Pavlov, Bechterev argued for a completely objective psychology, but, unlike them, Bechterev concentrated almost exclusively on the relationship between environmental stimulation and *behavior.*

In 1907 Bechterev and his collaborators left the Military Medical Academy to found the Psychoneurological Institute, which was later named the Bechterev Institute for Brain Research in his honor. When Bechterev died in 1927, his bibliography totaled about 600 articles and books written on a wide variety of topics in biology, psychology, and philosophy.

Reflexology. Bechterev summarized his views about psychology in *General Principles of Human Reflexology: An Introduction to the Objective Study of Personality*, which first appeared in 1917 and reached its fourth edition in 1928. By **reflexology**, Bechterev meant a strictly objective study of human behavior that seeks to understand the relationship between environmental influences and overt behavior. He took the position that if so-called psychic activity exists, it must manifest itself in overt behavior; therefore, "the spiritual sphere" can be bypassed by simply studying behavior. His reflexology studied the relationship between behavior (such as facial expressions, gestures, and speech) and physical, biological, and, above all, social conditions.

Many of Bechterev's ideas were also found in U.S. behaviorism at about the same time. It should be remembered, however, that Bechterev was writing about objective psychology as early as 1885 (Bechterev, 1928/1973). A few passages from Bechterev's *General Principles of Human Reflexology* (1928/1973) exemplify his thinking:

> In order to assume … a strictly objective standpoint in regard to man, imagine yourself in a position of being from a different world and of a different nature, and having come to us, say, from another planet.… Observing human life in all its complex expressions, would this visitor from another planet, of a different nature, ignorant of human language, turn to subjective analysis in order to study the various forms of human activity and those impulses which evoke and direct it? Would he try to force on man the unfamiliar experiences of another planetary world, or would this being study human life and all its various manifestations from the strictly objective point of view and try to explain to himself the different correlations between man and his environment, as we study, for example, the life of microbes and lowly animals in general? I think there can be no doubt of the answer.
>
> In following this method, obviously we must proceed in the manner in which natural science studies an object: in its particular environment, and explicate the correlation of the actions, conduct, and all

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> other expressions of a human individual with the external stimuli, present and past, that evoke them; so that we may discover the laws to which these phenomena conform, and determine the correlations between man and his environment, both physical, biological, and, above all, social.
>
> It is regrettable that human thought usually … presupposes an analogy with oneself—an analogy not existing in actual fact, at least not in the highest, and consequently more valuable, expressions of a human being.
>
> You will say that we use analogy everywhere, that in everyday life we cannot approach another man without it. All that is, perhaps, true to a certain extent, but science cannot content itself with this, because taking the line of subjective interpretation, we inevitably commit some fallacy. It is true that, in estimating another person, we turn to subjective terminology, and constantly say that such and such a man thinks this or that, reasons in this or that manner, etc. But we must not forget that everyday language and the scientific approach to natural phenomena cannot be identical. For instance, we always say of the sun that it rises and sets, that it reaches its zenith, travels across the sky, etc., while science tells us that the sun does not move, but that the earth revolves round it. And so, from the point of view of present-day science, there must be only one way of studying another human being expressing himself in an integration of various outward phenomena in the form of speech, facial and other expressions, activities, and conduct. This way is the method usually employed in natural science, and consists in the strictly objective study of the object, without any subjective interpretation and without introducing consciousness. (pp. 33–36)

By 1928, Bechterev was aware of the growing tendency toward objective psychology in the United States and claimed that he was the originator of that tendency:

> The literature on the objective study of animal behavior has grown considerably and in America an approach is being made to the study of human behavior, a study which has first been set on a scientific basis on Russian soil in my laboratories at the Military Medical Academy and at the Psychoneurological Institute. (Bechterev, 1928/1973, p. 214)

Bechterev or Pavlov. Who discovered the conditioned reflex? It was neither Bechterev nor Pavlov. Bechterev spent considerable time showing that such reflexes were known for a very long time: "These 'psychic' secretions, by the way, attracted attention as early as the 18th century. Even then it was known that when oats is given to a horse, he secretes saliva before the oats enters his mouth" (1928/1973, p. 403).

Both Bechterev and Pavlov studied conditioned reflexes at about the same time. What Pavlov called a conditioned reflex, Bechterev called an **association reflex**. Bechterev was well aware of Pavlov's research and thought that it had major flaws. In fact, almost every time Bechterev mentioned Pavlov in his 1928 book, he had something negative to say. Bechterev criticized Pavlov's "saliva method" for the following reasons:

- An operation is necessary for collecting gastric juices from the stomach.
- Pavlov's procedure cannot be easily used on humans.
- The use of acid to elicit an unconditioned response causes reactions in the animal that may contaminate the experiment.
- If food is used as an unconditioned stimulus, the animal will eventually become satiated and therefore no longer respond in the desired fashion.
- The secretory reflex is a relatively unimportant part of an organism's behavior.
- The secretory reflex is actually unreliable and therefore difficult to measure accurately.

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Instead of studying secretion, Bechterev (1928/1973) studied motor reflexes, and stated his reasons as follows:

> Luckily, in all animals, and especially in man, who particularly interests us in regard to the study of correlative activity, the secretory activities play a much smaller part than do motor activities, and, as a result of this, and for other reasons also (the absence of an operation, the possibility of exact recording, the possibility of frequent repetition of the stimuli … and the absence of any complications as a result of frequent stimulation in experiment) we give unconditional preference, in view of the above-mentioned defects of the saliva method, to the method of investigation of association—motor reflexes of the extremities and of respiration—a method developed in my laboratory. This method, which is equally applicable to animals and to man, and consists in the electrical stimulation on the front paw of the animal, and in man, of the palm or fingers of the hand, or the ball of the foot, with simultaneous visual, auditory, cutaneo-muscular and other stimulations, has as far as I know, not met with any opposition in scientific literature from the time of its publication. (p. 203)

Bechterev's concentration on the overt behavior of organisms was more relevant to U.S. behaviorism than was Pavlov's research on secretion. But Pavlov was the one whom Watson discovered, and therefore the name Pavlov became widely known in U.S. psychology. It is another one of those quirks of history that but for the sake of fortuitous circumstances, the name Bechterev could have been a household name instead of Pavlov. And as we will see, in his application of conditioning procedures, Watson actually followed Bechterev more closely than he did Pavlov.

Other Contributors

During Pavlov's day, Czarist Russia gave way to the Soviet Union, which in turn dissolved into a collection of independent states in the early 1990s. Military and political turmoil are generally not conducive to scholarship, but other psychologists did rise to prominence. The two best known are **Alexander Romanovich Luria (1902–1977)** and **Lev Semyonovich Vygotsky (1896–1934)**.

Luria was born in Kazan, where he also attended the local university, graduating in 1921. Interested in the physiologically-near objective psychology of the day, he later completed medical training in Moscow. In 1924 both Luria and Vygotsky were employed at the Institute of Psychology at Moscow University, and worked together on such matters as maturation, cultural differences in development, and the importance of language. Luria's study of conflict (for example, Luria, 1932) earned the praise of many in America. By the mid-1930s, Luria's interest had shifted to clinical neuropsychology, and he became internationally acclaimed for his study of brain damage, including in survivors from World War II.

Based on this work, Luria developed a theory of cortical function that divided the brain into three major blocks and accounted for the neurological processes essential for attention through action. Additionally he developed various neurological assessments that remain in use today as the Luria-Nebraska (Golden, Hammeke, & Purisch, 1980).

One of his most fascinating books, *The Mind of a Mnemonist* (1968), recounts Luria's involvement with Solomon Shereshevsky, a man with an amazing photographic memory that utilized synesthesia (where stimulation in one sensory system is also experienced in another—such as hearing music in colors).

Lev Vygotsky was born into a Jewish banking family that lived near Minsk in Byelorussia, what is today Belarus. Although his family insisted he study medicine at the Moscow State University, he concurrently enrolled in other courses so he could pursue humanities and law. After graduation in 1917, Vygostsky initially taught school but also read extensively in psychology and literature.

Following his first paper, which concerned the limits of a psychology focusing on just the reflex, Luria and colleagues invited him to the Institute at Moscow. In 1925 he completed his doctoral thesis on the psychology of art. His short but brilliant career (he died at 37) covered

RIA Novosti/Alamy

Lev Vygotsky

a variety of topics in just over a decade. These included studies of child psychology that are often still covered in modern texts, as well as work on play, intelligence, memory, perception, learning and cultural differences.

His most famous writings were eventually published in English as *Mind and Society* (1978) and *Thought and Language* (1934/1986). These works collect his efforts on cognitive development, including the relationship between thought and language. Much like the chicken and the egg, philosophers, linguists, and psychologists have long argued over which has primacy—language or thought. That is, which comes first and thus constrains the other. Although your intuitions may suggest that thought causes language, for objective psychologists (such as Pavlov), it seemed clear that language must be primary (see also, Whorf, 1956). Vygotsky proposed that the answer was not an either/or, and that the relationship between language and thought evolved during development. Like William James, one of his major influences, Vygotsky's style was to be synthetic and not dogmatic. Although he utilized the objective psychology of the day (including Watson and Yerkes, that we will consider next), he also embraced the Würzburgers and Gestaltists (Chapter 14). This did not always make him popular with his strong-minded Russian contemporaries, nor the State, which banned some of his works from 1936–1956. Nevertheless, subsequent writers have embraced him as a pioneer in the area of cognitive development and as a forerunner of the cognitive revolution (Chapter 19).

JOHN B. WATSON AND BEHAVIORISM

John Broadus Watson (1878–1958) was born in the village of Travelers Rest near Greenville, South Carolina. Religion was a major theme in Watson's troubled childhood:

> Watson's mother was "insufferably religious." She took an active role in the Reedy River Baptist Church and became one of the "principal lay organizers for the Baptists in the whole of South Carolina." In keeping with her proselytizing zeal, Emma named her youngest son John Broadus Watson, after John Albert Broadus, "one of the founding ministers of the Southern Baptist Theological Seminary which had been located in Greenville up until a few months before Watson's birth in January, 1878." John was made to vow to his mother that he would become a minister—"slated," as he put it, at an early age. Emma tied her family closely to the church, strictly adhering to the fundamentalist prohibition against drinking, smoking, or dancing. Cleanliness was always next to godliness, and Emma never ceased to keep her family next to God. (Karier, 1986, p. 111)

One can only speculate on the effects of his mother's intense religious convictions on Watson's

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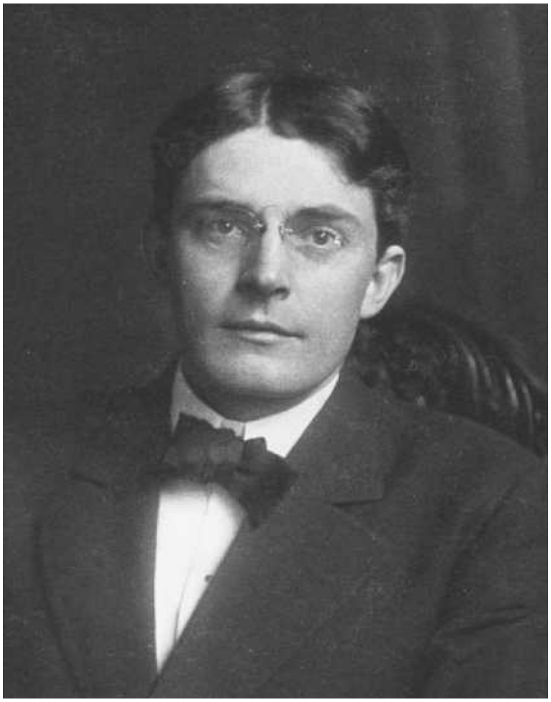
Courtesy of The Johns Hopkins University

John B. Watson

life, but the origin of his lifelong fear of the dark seems telling:

> The nurse [that Emma, Watson's mother, had employed] told him [Watson] that the devil lurked in the dark and that if ever Watson went a-walking during the night, the Evil One might well snatch him out of the gloom and off to Hell. Emma seems to have done nothing to stop the nurse instilling such terrors in her young son. Most likely, she approved. To be terrified of the Devil was only right and prudent. As a fundamentalist Baptist, she believed that Satan was always prowling. All this left Watson with a lifelong fear of the dark. He freely admitted that he studied whether children were born with an instinctual fear of the dark because he had never managed to rid himself of the phobia. He tried a number of times to use his behaviourist principles to cure himself but he never really managed to do it. As an adult Watson was often depressed, and when he got depressed he sometimes had to sleep with his light on. (Cohen, 1979, p. 7)

Although his mother was extremely religious, his father was not. His father drank, swore, and chased women. This incompatibility finally resulted in Watson's father leaving home in 1891, when Watson was 13 years old. He and his father had been close, and his father's departure disturbed him deeply. Watson immediately became a troublemaker and was arrested twice, once for fighting and once for firing a gun in the middle of Greenville. Later, when he was famous, his father sought out his son, but Watson refused to see him.

Watson's Education

Undergraduate Years. Despite a history of laziness and violence in school, Watson was charming and persuasive, indeed charismatic, and was accepted to Furman University at the age of 15. While at college, Watson continued to live at home and worked at a chemical laboratory in order to pay his fees. His most influential teacher at Furman was Gordon B. Moore, who taught philosophy and psychology. The psychology Watson learned included the works of Wundt and James.

At Furman, Watson did well and should have graduated in 1898, but an unusual event set him back. Moore, his favorite teacher, warned that he would flunk any student who handed his or her examination in backward, and "by some strange streak of luck" (Watson, 1936, p. 272) Watson did so. The episode ended up benefiting Watson, however, because during the extra year at Furman that failing Moore's course necessitated, he earned a master's degree at the age of 21.

> Watson then made what he later called "an adolescent resolve [to] make [Moore] seek me out for research some day." Years later, as a professor at Johns Hopkins University, Watson had his revenge. To his "surprise and real sorrow," Watson recalled, he

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> received a request from his former teacher to be accepted as a research student. Before it could be arranged, Moore's eyesight failed; within a few years, he died. (Buckley, 1989, p. 12)

Following graduation, Watson taught in a one-room school in Greenville, for which he earned $25 a month. When his mother died, he decided to continue his education and he applied to both Princeton and the University of Chicago. When he learned that Princeton required a reading knowledge of Greek and Latin, he decided to go to Chicago, where Moore had previously studied during a sabbatical.

Watson arrived in Chicago in 1900, with $50 and no other financial resources. To survive, he took a room in a boardinghouse and worked as a waiter to pay for his room and board. He also earned $1 a week as a janitor in the psychology department and another $2 a week for taking care of the white rats in the laboratory.

The Chicago Years. At Chicago, Watson studied the British empiricists with A. W. Moore (not the Gordon B. Moore of Furman). Watson especially liked Hume, perhaps because his philosophy held nothing sacred. Watson also studied philosophy with John Dewey, but the faculty members who had the greatest influence on him were the functionalist James Angell, and the physiologist Jacques Loeb. Loeb (1859–1924) was famous for his work on **tropism**, having shown that the behavior of simple organisms could be explained as being automatically elicited by stimuli. Just as plants orient toward the sun because of the way they are constructed, so do animals respond in certain ways to certain stimuli because of their biological makeup. According to Loeb, no mental events are involved in such tropistic behavior; it is simply a matter of the stimulation and the structure of the organism. This viewpoint, which Loeb applied to plants, insects, and lower animals, Watson would later adapt to humans as well.

Under the influence of Angell and Henry Donaldson, a neurologist, Watson began to investigate developmental and learning process in the white rat. In 1901 Willard Small at Clark had published an article on the maze-learning ability of the white rat, but in general Watson had little information to build upon. By the end of 1902, however, he knew more about the white rat than anyone else in the United States. Also about this time, Watson first began to wonder if "you could understand rats without the convolutions of introspection, could you not understand people the same way?" (Cohen, 1979, p. 33). When Watson expressed these ideas to Angell in 1904, Angell responded negatively and told him that he should stick to animals, thus silencing the matter for several years.

As evidenced by the tone and content of his autobiography (1936), Watson struggled with depression throughout his lifetime, including during graduate school. Still, in 1903, he managed to submit his doctoral thesis: "Animal Education: The Psychical Development of the White Rat." Watson received his doctorate (magna cum laude) at age 25, making him the youngest person to attain a doctorate at the University of Chicago. Donaldson lent Watson $350 to publish the work, but Watson took 20 years to repay the loan.

The University of Chicago hired Watson as an assistant professor for a salary of $600 a year, and he taught courses in both animal and human psychology. For the latter, he used Titchener's laboratory manuals. During this time, Watson married one of his students, Mary Ickes. Mary was from a prominent family, and her brother would eventually serve as Secretary of the Interior under Franklin D. Roosevelt. Buckley (1989) describes the origin of Watson's relationship with Mary:

> As family legend has it, Mary was a student in Watson's introductory psychology class. She developed a crush on her professor and during one long exam wrote a love poem in her copybook instead of answers to the test questions. When Watson insisted on taking the paper at the end of the quiz, Mary blushed, handed him the paper, and ran from the room. The literary effort must have had its desired effect. (p. 49)

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Watson actually married Mary twice—once in 1903, in private, because of her family's strong opposition to her relationship with Watson, and a second time, publicly, in 1904. The marriage produced two children, Mary (nicknamed Polly) and John. Polly was the mother of television and film star Mariette Hartley.

About this same time, Watson also began his correspondence with another young animal researcher, Robert Yerkes. After receiving his doctorate from Harvard in 1902, Yerkes had been offered an appointment at Harvard as instructor of comparative psychology. In his career, Yerkes studied the instincts and learning abilities of many different species, including mice, crabs, turtles, rats, worms, birds, frogs, monkeys, pigs, and apes. In Chapter 10, we saw that Yerkes was also instrumental in the creation of the Army Alpha and Beta tests of intelligence.

In 1906 Watson and the prominent functionalist Harvey Carr began research designed to determine what sensory information rats used as they learned to solve a complex maze. Using 6-month-old rats that had previously learned the maze, Watson began systematically to remove one sensory system after another, in hopes of learning which sensory system the rats used to traverse the maze correctly. One by one, he eliminated the senses of vision, hearing, and smell. Nothing appeared to make a difference. After full recovery from each operation, the rats were able to traverse the maze accurately. Watson and Carr then took a naive group of rats and performed the same operations, finding that the naive rats learned the maze as well as the rats that had full sensory apparatus. Watson then speculated that perhaps the rats were using their whiskers, but shaving off the whiskers made no difference; even destroying the sense of taste made no difference. Watson and Carr finally found that the rats were relying on kinesthetic sensations—sensations from the muscles. If the maze was made shorter or longer, after destruction of the kinesthetic sense, the rats were confused and made many errors. This discovery of the importance of kinesthetic sensation was to play a central role in Watson's later theory. Watson published the research results in 1907 in an article titled "Kinesthetic and Organic Sensations: Their Role in the Reactions of the White Rat to the Maze."

In 1907 the Carnegie Institution offered Watson an opportunity to study the migratory instinct of terns, and Watson made several visits to an island near Key West, Florida, to do so. Much of his research on instinctive behavior was done in collaboration with Karl Lashley, who was later to make significant contributions to neurophysiological psychology (see Chapter 18). One summer, Watson brought Lashley with him to see whether terns, in fact, had the ability to home. To find out, Lashley took a number of terns to Mobile, Alabama, and some to Galveston, Texas, and released them. The results were exciting. Without any training, the terns found their way back to the small island, which was about a thousand miles from where Lashley had taken them. Watson and Lashley tried in vain to explain how the terns did it; in the end, both men turned to other matters. Watson and Lashley's publication, "Homing and Related Activities of Birds" (1915), provides an interesting contrast to their later work. Although as an aside, Watson and Lashley also cooperated in research on what is now called "sports psychology," attempting to improve the performance of archers. Results showed that distributed practice enhanced performance more than massed practice (Lashley, 1915).

At Johns Hopkins

By 1907 Watson had a national reputation in animal psychology, and he was offered a position at Johns Hopkins University. He really did not want to leave the University of Chicago, but the offer of $3,000 a year from Johns Hopkins was irresistible. Watson arrived in Baltimore in August 1908. At Johns Hopkins, psychology was part of the Department of Philosophy, Psychology, and Education, and James Mark Baldwin was chairman of the department. Baldwin (recall Chapter 11) was also then editor of *Psychological Review*, one of psychology's leading journals.

Other faculty included Knight Dunlap, another psychologist disaffected with introspection and the study of consciousness, who would serve as APA

President in 1922. Watson's initial duties involved teaching human psychology, for which he still used Titchener's manuals. Watson wrote to Titchener about the problems he was having with the laboratory at Johns Hopkins, and the two exchanged many letters from that point on. Both men always showed great respect for each other, and in Watson's time of great trouble (discussed shortly), Titchener was the only major psychologist who stuck with him.

It was December 1908 when Baldwin's discovered presence in a brothel forced his resignation. For more details concerning the "Baltimore affair" see Horley (2001), but upon Baldwin's resignation, Watson became the editor of the *Psychological Review*.

For many years, Watson had been pondering a purely behavioristic position, but when he tried his ideas on those closest to him—for example, Angell and Yerkes—they discouraged him because they both believed that the study of consciousness still had an important place in psychology. Watson first publicly announced his behavioristic views in 1908 at a colloquium at Yale University. Watson was again severely criticized, and again he fell silent.

In 1913 Watson decided to take another plunge. When asked to give a series of lectures at Columbia University, he used the opportunity to state his views on behaviorism. He began his now famous lecture, "Psychology as the Behaviorist Views It" (1913), with the following statement:

> Psychology as the Behaviorist views it is a purely objective experimental branch of natural science. Its theoretical goal is the prediction and control of behavior. Introspection forms no essential part of its methods, nor is the scientific value of its data dependent upon the readiness with which they lend themselves to interpretation in terms of consciousness. The Behaviorist, in his efforts to get a unitary scheme of animal response, recognizes no dividing line between man and brute. The behavior of man, with all of its refinement and complexity, forms only a part of the Behaviorist's total scheme of investigation. (p. 158)

Published in 1913 in the *Psychological Review*, this lecture is usually taken as the formal founding of behaviorism.

Responses immediately began rolling in. Titchener was not upset because he felt Watson had outlined a technology of behavior that did not conflict with psychology proper; but Angell, Cattell, and Woodworth criticized Watson for being extreme. Thorndike too, although sympathetic toward much of Watson's program, expressed concern that it might become "a restrictive orthodoxy" (Joncich, 1968).

After his Columbia lectures, Watson was publicly committed to behaviorism and had little tolerance for any other brand of psychology. Watson's ideas were radical, but their acceptance grew steadily over the next several years (Samelson, 1981). Watson was elected president of the Southern Society for Philosophy and Psychology in 1914. The same year, he was elected the 24th president of the APA—all this at the age of 36 and only 11 years after receiving his doctorate from the University of Chicago.

Watson's accomplishments at Johns Hopkins are even more impressive when one realizes that his professional activities were interrupted by induction into military service between 1917 and 1919. He was as iconoclastic in the military as he was in his youth, and he was almost court-martialed for insubordination. In his autobiography, he summarized his military experience in these words: "Never have I seen such incompetence, such extravagance, such a group of overbearing, inferior men" (1936, p. 278). Nonetheless he attained the rank of major and was honorably discharged.

Sex Scandal. As rapidly as Watson's position in academic psychology rose, it fell even more suddenly. In 1920 Watson's wife discovered that he was having an affair with Rosalie Rayner, with whom he was doing research on infant behavior, and sued him for divorce. Although some have suggested that Watson was using sex to study conditioning with Rosalie, more detailed biographers (for example, Buckley, 1989) fail to support that idea. Like Mary, Rosalie was from a prominent family and had sought to work with Watson following her graduation from Vassar.

The scandal was too much for Johns Hopkins: Watson was asked to resign, and he did. For all practical purposes, this marked the end of Watson's academic career in psychology. He still wrote about and lectured on psychology, and revised many of his earlier works, but now he directed his ideas toward the general public rather than psychologists. In the days before television and the Internet his works now appeared in leading popular magazines such as *Harper's*, the *New Republic*, *McCall's*, and *Cosmopolitan* instead of in professional journals. Watson also spoke on many radio talk shows. Ironically then, Watson's ideas were reaching a vastly larger audience, and his influence on psychology flourished. The following is a sample of titles of his articles and radio talks: "How We Think" (1926), "The Myth of the Unconscious" (1927), "On Reconditioning People" (1928), "Feed Me on Facts" (1928), "Why 50 Years from Now Men Won't Marry" (1929), "After the Family—What?" (1929), "Women and Business" (1930), and "On Children" (1935).The last such article Watson wrote was titled "Why I Don't Commit Suicide." He submitted it to *Cosmopolitan*, but it was rejected as too depressing.

Advertising. In 1921 Watson's divorce was final, and he married Rosalie Rayner; he was 42 and she was 21. They eventually had two children, William ("Billy"), born in 1921, and James, born in 1924. Brewer (1991) speculates that the combination of first names, William and James, reflected Watson's admiration for William James. When Watson married Rosalie, he was out of work and again broke.

With an inkling that he could apply his behavioral conditioning to advertising, Watson interviewed with Stanley Resor, head of one of the world's largest ad agencies—the J. Walter Thompson Company (Kreshel, 1990). Cohen (1979) describes the job interview and the job itself:

> Resor was a man who had graduated from Yale with no great distinction in 1901.… Now John B. Watson, who was recognized as being one of the greatest psychologists in the world, who was in the same intellectual league as Freud and Russell and Bergson, was asking Resor for a job.… Resor had to address the annual convention of the Boot Sellers League of America … [and] wanted some quick research to be done on the boot market. John B. Watson was given the job of studying the rubber boot market on each side of the Mississippi River from Cairo to New Orleans. (p. 161)

Resor asked for letters of recommendation for Watson, and a very supportive one came from none other than Titchener:

> Watson was always deeply grateful to Titchener for consenting to write a reference and wrote to him in 1922 that "I know, in my heart, that I owe you more than almost all my other colleagues put together." (Cohen, 1979, p. 172)

Resor hired Watson in 1921 at a salary of $10,000 a year. By 1924 Watson was one of the leading people in advertising and became a vice president of the J. Walter Thompson Company. Titchener wrote and congratulated him but worried that the promotion would give Watson less time to work on psychology. By 1928 Watson earned over $50,000 a year and, by 1930, over $70,000. That would be an annual salary of nearly a million dollars today.

Watson soon became a pioneer in market research. Early examples include his finding that blindfolded smokers could not differentiate among different brands of cigarettes. Because preference must be based on the images associated with various brand names, Watson concluded that sales could be influenced by manipulating the images associated with brand names. Following this strategy, Watson improved the sales of such products as Johnson's baby powder, Pebeco toothpaste, Ponds cold cream, Maxwell House coffee, and Odorono, one of the early deodorants.

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Watson used product endorsements from celebrities to build associations in a way analogous to Pavlovian conditioning. For example, if cold cream is a "neutral stimulus" but is paired with an exciting well-known figure that many women already held positive feelings toward, such as Queen Maria of Romania, then Maria would function like an unconditioned stimulus. After seeing ads in which Maria was paired with the cold cream, then those feelings for Maria could come to color the cream. Other techniques built off of Watson's psychological understanding of basic human drives and emotions, such as sex, love, and fear.

In 1935 Watson left the J. Walter Thompson Company to become vice president of William Esty Advertising, where he remained until his retirement in 1945 at the age of 67. For more about Watson's contributions to the field of advertising, see Larson (1979) and Kreshel (1990).

Even though Watson's accomplishments in advertising were vast, his first love was always psychology, and he regretted for the rest of his life that he was unable to pursue his professional goals, especially his research on children. How psychology would be different today if Watson had not been dismissed from Johns Hopkins in 1920 cannot be known, but surely it would be different.

Watson's Objective Psychology

When Watson discovered Russian objective psychology, he found a kindred voice, but he had arrived at his position independently of the Russians. What Watson and the Russian psychologists had in common was a rejection of introspection and of any explanation of behavior based on mentalism. Most of the Russian physiologists, such as Sechenov and Pavlov, were more interested than Watson in explaining the biology underlying behavior, especially brain physiology. As time went by, Watson became even less interested in physiology and more interested in correlating stimuli and responses. He called the brain a "mystery box" that was used to account for behavior when the real cause was unknown. As such, Watson's approach to studying organisms (including humans) was closer to Bechterev's than it was to Sechenov's or Pavlov's. In fact, the approaches of Bechterev and Watson were *very* close, both methodologically and philosophically.

In his 1913 statement on behaviorism, Watson did not mention the work of the Russians and said very little about human behavior. And though Watson's first book (1914) dealt mainly with animal behavior, there was still no mention of the Russian physiologists. Finally, in his presidential address to the APA in 1915 (published as "The Place of the Conditioned Reflex in Psychology" in 1916), Watson suggested that Pavlov's work on the conditioned reflex could be used to explain human as well as animal behavior. But as we will see, he had his own notions concerning the terms *stimulus* and *response* and concerning the learning process.

The Goal of Psychology. In his major work (*Psychology from the Standpoint of a Behaviorist*, 1919), Watson fully elaborated his stimulus–response psychology. In his 1913 article, he had stated the goal of psychology as the prediction and control of behavior, and in 1919 he explained further what he meant:

> If its facts were all at hand the behaviorist would be able to tell after watching an individual perform an act what the situation is that caused his action (prediction), whereas if organized society decreed that the individual or group should act in a definite, specific way the behaviorist could arrange the situation or stimulus which would bring about such action (control). In other words, *Psychology from the Standpoint of the Behaviorists* is concerned with the prediction and control of human action and not with an analysis of "consciousness." (pp. vii–ix)

He went on to say,

> The goal of psychological study is the ascertaining of such data and laws that, given the stimulus, psychology can predict what the response will be; or, on the other

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> hand, given the response, it can specify the nature of the effective stimulus. (1919, p. 10)

Watson, however, did not use the terms *stimulus* and *response* in as narrow a sense as the Russian physiologists. For him, a stimulus could be a general environmental situation or some internal condition of the organism. A response was anything the organism did—and that included a great deal:

> The rule, or measuring rod, which the behaviorist puts in front of him always is: Can I describe this bit of behavior I see in terms of "stimulus and response"? By stimulus we mean any object in the general environment or any change in the tissues themselves due to the physiological condition of the animal, such as the change we get when we keep an animal from sex activity, when we keep it from feeding, when we keep it from building a nest. By response we mean anything the animal does—such as turning toward or away from a light, jumping at a sound, and more highly organized activities such as building a skyscraper, drawing plans, having babies, writing books, and the like. (J. B. Watson, 1924/1930, pp. 6–7)

Thus, Watson's position has been unjustly called "the psychology of twitchism," implying that it is concerned with specific reflexes elicited by specific stimuli. Likewise, Watson has often been portrayed as saying the mind and thinking did not exist, another overstatement of his focus on behavior.

Types of Behavior and How They Are Studied. For Watson, there were four types of behavior: *explicit learned behavior* such as talking, writing, and playing baseball; *implicit learned behavior* such as the increased heart rate caused by the sight of a dentist's drill; *explicit unlearned behavior* such as grasping, blinking, and sneezing; and *implicit unlearned behavior* such as glandular secretions and circulatory changes. According to Watson, everything that a person did, including thinking, falls into one of these four categories.

For studying behavior, Watson proposed four methods: *observation*, either naturalistic or experimentally controlled; the *conditioned-reflex method*, which Pavlov and Bechterev had proposed; *testing*, by which Watson meant the taking of behavior samples and *not* the measurement of "capacity" or "personality," ala Cattell; and *verbal reports*, which Watson treated as any other type of overt behavior.

Language and Thinking. For Watson, language and thinking were a form of behavior *and nothing more*: "*Saying* is doing—that is, *behaving*. Speaking overtly or to ourselves (thinking) is just as objective a type of behavior as baseball" (1924/1930, p. 6). Language presented no special problem; it was simply an overt behavior. Watson solved the problem of thinking by claiming that thinking is internal or subvocal speech. Because overt speech is produced by substantial movement of the tongue and larynx, Watson assumed that minute movements of the tongue and larynx accompany thought. Watson (1924/1930) described the evolution from overt speech to implicit speech (thinking) as follows:

> The child talks incessantly when alone. At three he even plans the day *aloud*, as my own ear placed outside the keyhole of the nursery door has very often confirmed. Soon society in the form of nurse and parents steps in. "Don't talk aloud—Daddy and Mother are not always talking to themselves." Soon the overt speech dies down to whispered speech and a good lip reader can still read what the child thinks of the world and of himself. Some individuals never make this concession to society. When alone they talk aloud to themselves. A still larger number never go beyond even the whispering stage when alone. Watch people reading on the street car; peep through the keyhole sometime when individuals not too highly socialized are just sitting and thinking. But the great majority of people pass on to the third stage under the influence of social pressure constantly exerted. "Quit whispering to yourself," and "Can't you even read

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> without moving your lips?" and the like are constant mandates. Soon the process is forced to take place behind the lips. Behind these walls you can call the biggest bully the worst name you can think of without even smiling. You can tell the female bore how terrible she really is and the next moment smile and overtly pay her a verbal compliment. (pp. 240–241)

Although there was some experimental support for Watson's contention that thought consisted entirely of subvocal speech (see, for example, Jacobson, 1932), the contention was widely opposed. Woodworth's (1931) reaction was typical:

> I may as well tell you in a few words some reasons why I personally do not accept the equation, thought = speech. One is that I often have difficulty in finding a word required to express a meaning which I certainly have "in mind." I get stuck not infrequently, for even a familiar word. Another reason is that you certainly cannot turn the equation around and say that speech = thought. You can recite a familiar passage with no sense of its meaning, and while thinking something entirely different. Finally, thinking certainly seems as much akin to seeing as to manipulating. It seems to consist in seeing the point, in observing relations. Watson's speech habits substituted for actual manipulation fail to show how thinking carries you beyond your previous habits. Why should the combination of words, "Suppose I moved the piano over there," lead to the continuation, "But it would jut out over the window," just as a matter of language habit? Something more than the words must certainly be in the game, and that something consists somehow in seeing the point. (p. 72)

The problem of determining the nature of thought and determining thought's relationship to behavior is as old as psychology and is just as much an issue today as it ever was. Watson did not solve the problem, but neither has anyone else.

Instincts and Behavior. Watson's attitude toward instincts changed radically over the years. In 1914 instincts played a prominent role in his theory. By 1919 Watson had taken the position that instincts are present in infants but that learned habits soon displace them. In 1925 he completely rejected the idea of instincts in humans, contending that there are a few simple reflexes such as sneezing, crying, eliminating, crawling, sucking, and breathing but no complex, innate behavior patterns called instincts. In 1926 Watson said,

> In this relatively simple list of human responses there is none corresponding to what is called an "instinct" by present-day psychologists and biologists. There are then for us no instincts—we no longer need the term in psychology. Everything we have been in the habit of calling an "instinct" today is a result largely of training—belonging to man's *learned behavior.* (p. 1)

For Watson *experience* and not inheritance makes people what they are. Change experience, and you change personality. Thus, Watson's (1926) position ended up as a **radical environmentalism**. Perhaps with Goddard in mind he wrote:

> I would feel perfectly confident in the ultimate favorable outcome of careful upbringing of a *healthy, well-formed baby* born of a long line of crooks, murderers, thieves and prostitutes. Who has any evidence to the contrary? Many, many thousands of children yearly, born from moral households and steadfast parents, become wayward, steal or become prostitutes, through one mishap or another of nurture. Many more thousands of sons and daughters of the wicked grow up to be wicked because they couldn't grow up any other way in such surroundings. But let one adopted child who had a bad ancestry go wrong and it is used as incontestible [*sic*]

> evidence for the inheritance of moral turpitude and criminal tendencies. (p. 9)

Watson (1926) did, however, allow for heritable differences in *structure* that could influence personality characteristics:

> So let us hasten to admit—yes, there are heritable differences in form, in structure. Some people are born with long, slender fingers, with delicate throat structure; some are born tall, large, of prize-fighter build; others with delicate skin and eye coloring. These differences are in the germ plasm and are handed down from parent to child.… But do not let these undoubted facts of inheritance lead you astray as they have some of the biologists. The mere presence of these structures tell us not one thing about function.… Our hereditary structure lies ready to be shaped in a thousand different ways—the same structure mind you—depending on the way in which the child is brought up. (p. 4)

Watson also gave the following example of how structure interacts with experience to produce specific behavior patterns:

> The behaviorist would *not* say: "He inherits his father's capacity or talent for being a fine swordsman." He would say: "This child certainly has his father's slender build of body, the same type of eyes. His build is wonderfully like his father's. He, too, has the build of a swordsman." And he would go on to say: "And his father is very fond of him. He put a tiny sword into his hand when he was a year of age, and in all their walks he talks sword play, attack and defense, the code of duelling and the like." A certain type of structure, plus early training—*slanting*—accounts for adult performance. (1926, p. 2)

Finally, Watson (1926) made one of the most famous statements in the history of psychology:

> I should like to go one step further tonight and say, "Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select —a doctor, lawyer, artist, merchant-chief and, yes, even into beggarman and thief, regardless of his talents, penchants, tendencies, abilities, vocations and race of his ancestors." (p. 10)

In one of your authors' (TBH) office, there is only a single picture that features a psychologist. It shows John Watson setting in conversation with arguably the greatest trial lawyer ever—Clarence Darrow (1847–1938). Although most famous for the Scopes "Monkey" trial that concerned the teaching of evolution, Darrow used Watson's logic to great advantage in his defense of two brilliant teenaged college students, Nathan Leopold and Richard Loeb.

Both from extremely wealthy families, the boys kidnapped and murdered 14-year-old Bobby Franks, just to see if they could commit a perfect crime. Suffice it to say that the details of this premeditated murder, as well past criminal acts, thoroughly painted the boys as monstrous and as exceptional candidates for the death penalty. Darrow's strategy was to have them plead guilty (which they were), but then to argue that their actions were not made by a conscious choice to do wrong, but had been determined by a combination of physiological, environmental, and (behavioral) psychological factors beyond their control. Neither received the death penalty.

Little Albert

Watson believed that, along with structure and the basic reflexes, humans inherit the emotions of fear, rage, and love. In infants, fear is elicited by loud noises and loss of support (such as falling), rage by restricting the infant's freedom of movement, and love by stroking or patting the infant. Through learning, these emotions come to be elicited by stimuli other than those that originally elicited them.

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J. B. Watson, Rosalie Rayner, and Albert (with the rat)

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Furthermore, all adult emotions such as hate, pride, jealousy, and shame are derived from fear, rage, and love.

To demonstrate how emotions could be displaced to stimuli other than those that had originally elicited the emotions, Watson and Rosalie Rayner performed an experiment in 1920 on an 11-month-old infant named Albert. They showed Albert a white rat, and he expressed no fear of it. In fact, he reached out and tried to touch it.

Subsequently, as Albert reached for the rat, from behind the boy Watson struck a steel bar with a hammer. The loud, unexpected noise caused Albert to jump and fall forward. Again Albert was offered the rat, and just as he touched it, the steel bar behind him was again struck. Again Albert jumped, and this time he began to cry. A week later, when the rat was again presented to Albert, Albert was less enthusiastic and attempted to keep his distance from it. Five more times Watson and Rayner placed the rat near Albert and struck the steel bar; and Albert, who had at first been attracted to the rat, was now frightened of it:

> The instant the rat was shown the baby began to cry. Almost instantly he turned sharply to the left, fell over on his left side, raised himself on all fours and began to crawl away so rapidly that he was caught with difficulty before reaching the edge of the table. (Watson & Rayner, 1920, p. 5)

Five days later, Watson and Rayner found that Albert's fear of the rat was just as strong as it had been at the end of testing and that the fear had generalized to other furry objects such as a rabbit, a dog, a fur coat, and a Santa Claus mask. Watson and Rayner had clearly demonstrated how experience rearranged the stimuli that caused emotional responses. They believed that all adult emotional reactions develop by the same mechanism that had operated in the experiment with Albert—that is, contiguity.

Although they knew the origin of Albert's fears, Watson and Rayner (1920) speculated about how the Freudians might interpret Albert's fears later in his life:

> The Freudians twenty years from now, unless their hypotheses change, when they come to analyze Albert's fear of a seal skin coat—assuming that he comes to analysis at that age—will probably tease from him the recital of a dream which upon their analysis will show that Albert at three years of age attempted to play with the pubic hair of the mother and was scolded violently for it.… If the analyst has sufficiently prepared Albert to accept such a dream when found as an explanation of his avoiding tendencies, and if the analyst has the authority and personality to put it over, Albert may be fully convinced that the dream was a true revealer of the factors which brought about the fear. (p. 14)

Although Watson was generally critical of psychoanalysis, his coverage of such ideas did much to popularize psychoanalytical views, and he was a pioneer in the effort to scientifically evaluate psychoanalytic concepts (Rilling, 2000). Also, Watson, as we will see, appreciated the fact that Freud helped to lift the veil of secrecy concerning sexual matters.

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Watson and Rayner found that Albert's fear of the rat was still present a month after Albert's training. They intended to eliminate Albert's fear, but before they could do so he was removed from the hospital in which he was living. It was left to Mary Cover Jones (1896–1987), under Watson's supervision, to show how a child's fear could be systematically eliminated. Watson believed that his earlier research on Albert had shown how fear was produced in a child, and he felt strongly that no further research of that type was necessary. Instead, he would find children who had already developed a fear and would try to eliminate it. The researchers found such a child—a three-year-old boy named Peter who was intensely frightened of white rats, rabbits, fur coats, frogs, fish, and mechanical toys.

Peter and the Rabbit. Watson and Jones first tried showing Peter other children playing fearlessly with objects of which he was frightened, and there was some improvement. This is a technique called *modeling*, and is also still employed today. At this point, Peter came down with scarlet fever and had to go to the hospital. Following recovery, he and his nurse were attacked by a dog on their way home from the hospital, and all of Peter's fears returned in magnified form. Watson and Jones decided to try counterconditioning on Peter. Peter ate lunch in a room 40 feet long. One day as Peter was eating lunch, a rabbit in a wire cage was displayed far enough away from him so that Peter was not disturbed. The researchers made a mark on the floor at that point. Each day they moved the rabbit a bit closer to Peter until one day it was sitting beside Peter as he ate. Finally, Peter was able to eat with one hand and play with the rabbit with the other. The results generalized and most of Peter's other fears were also eliminated or reduced.

This is one of the first examples of what we now call **behavior therapy**. In 1924 Jones published the results of the research with Peter, and in 1974 she published more of the details surrounding the research. Rutherford (2006) regrets that reports of Jones's professional accomplishments typically include only her involvement in the "little Albert study." She reviews Jones's less known, but impressive, research on development across the life span, in which she consistently emphasized the importance of individual differences.

Child Rearing

Watson, an extremely popular writer and speaker, dealt with many topics, but his favorite topic, and the one that he considered to be most important, was children. Unable to continue his laboratory studies after being forced out of the profession of psychology, he decided to share his thoughts about children with the public by writing, with the assistance of his wife Rosalie, *The Psychological Care of the Infant and Child* (1928), which was dedicated to "The first mother who brings up a happy child." The book was extremely successful (it sold 100,000 copies in a few months), and in many ways Watson was the Dr. Spock of the 1920s and 1930s. Watson and Watson's (1928) advice was to treat children as small adults:

> Never hug and kiss them, never let them sit on your lap. If you must, kiss them once on the forehead when they say good night. Shake hands with them in the morning. Give them a pat on the head if they have made an extraordinary good job of a difficult task. Try it out. In a week's time you will find how easy it is to be perfectly objective with your child and at the same time kindly. You will be utterly ashamed at the mawkish, sentimental way you have been handling it. (pp. 81–82)

Watson and Watson went on to say, "When I hear a mother say, 'Bless its little heart' when it falls down, or stubs its toe, or suffers some other ill, I usually have to walk a block or two to let off steam" (1928, p. 82). And finally, Watson and Watson (1928) gave the following warning:

> In conclusion won't you then remember when you are tempted to pet your child that mother love is a dangerous instrument? An instrument which may inflict a never healing wound, a wound which may

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> make infancy unhappy, adolescence a nightmare, an instrument which may wreck your adult son or daughter's vocational future and their chances for marital happiness. (p. 87)

One suspects that their book on child rearing reflected John's ideas more than Rosalie's. In a 1930 article titled "I am the Mother of a Behaviorist's Sons," Rosalie wrote:

> In some respects I bow to the great wisdom in the science of behaviourism, and in others I am rebellious.… I secretly wish that on the score of (the children's) affections they will be a little weak when they grow up, that they will have a tear in their eyes for the poetry and drama of life and a throb for romance.… I like being merry and gay and having the giggles. The behaviorists think giggling is a sign of maladjustment. (Boakes, 1984, p. 227)

In 1935 Rosalie Watson died suddenly from illness at the age of 35. Watson was devastated and "the social aspects of his life all but disappeared" (Buckley, 1989). The period following Rosalie's death was also hard on the children. The emotional support Rosalie provided the family was now missing. James remembered his father as bright, charming, and reflective but devoid of emotional responsiveness. James said his father was "unable to express and cope with any feelings of emotion of his own, and determined unwittingly to deprive, I think, my brother and me of any emotional foundation" (Hannush, 1987, p. 138).

In spite of bouts with depression, James went on to receive a degree in industrial psychology and become a successful corporate executive. During adolescence, Billy had a contemptuous relationship with his father. The estrangement deepened when, following graduation from college, Billy decided to become a psychiatrist, which Watson took as "a slap in the face." After a time, Watson and Billy reached an uneasy peace, but the conflict between them was never completely resolved. Billy eventually took his own life (Buckley, 1989).

Sex Education. Watson also had a great deal to say about sex education, urging that children be given frank, objective information about sex; and he often expressed his gratitude to Freud for breaking down the myth and secrecy surrounding sex. None other than Bertrand Russell reviewed Watson's book on child rearing. Although Russell felt that Watson's emphasis on the environment was extreme and that Watson had gone a bit too far in banning hugging and kissing, he heaped praise on the book. Watson's liberal views, however, did not impress all psychologists:

> The honesty in sex education which Watson demanded seemed wholly admirable to Russell. Watson had also revived Plato's argument that perhaps it would be best for parents and children not to know each other. While this was bound to shock the American public, Russell believed this was an issue that was worth discussing. He ended by saying that no one since Aristotle had actually made as substantial a contribution to our knowledge of ourselves as Watson had—high praise indeed, from a man who was then regarded as one of the greatest minds in the world! None of this impressed most psychologists who complained that Watson had demeaned himself, which was only to be expected, and demeaned their science, which was only to be deplored. (Cohen, 1979, p. 218)

As one may suspect from the above quotation, Russell admired Watson for more than his thoughts on child rearing. For example, in *The Analysis of Mind* (1921/2005), Russell comments favorably on Watson's proposed solutions to a number of philosophical problems, such as those related to "consciousness."

Watson's Legacy

Although Watson was very impressed by Thorndike's early animal research, he believed that Thorndike's law of effect was unnecessarily mentalistic. After all, what was a "satisfying state of affairs?" For Watson

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the important thing about conditioning is that it causes events to be associated in time; that is, it establishes contiguity. Employing the concept of reinforcement is unnecessary. Instead of relying on Thorndike's law of effect, Watson explained learning in terms of the ancient principles of contiguity and frequency. In other words, Watson's explanation of learning was more similar to that of Pavlov's and Bechterev's than it was to Thorndike's.

Watson pointed out that in a learning situation, a trial always ends with the animal making the correct response. This means that the correct response tends to occur more frequently than incorrect responses and that the more often a response is made, the higher the probability that it will be made again (the law of frequency). It also means that the final response an organism makes in a learning situation will be the response it will tend to make when it is next in that situation; Watson called this the **law of recency**. In the classical conditioning situation, the conditioned stimulus (CS) and the unconditioned stimulus (US) become associated (elicit the same type of response) simply because they occur at about the same time (the law of contiguity). According to Watson, learning results from the mechanical arrangement of stimuli and responses; no "effects" of any type entered into his explanation.

The Mind–Body Problem. By the time Watson had begun to formulate his theory, there were four views on the mind–body relationship. One was an *interactionist* view of the type Descartes had asserted. According to this position, the mind can influence the body, and the body influences the mind. That is, the mind and the body interact. A second position was *psychophysical parallelism*, according to which mental and bodily events are parallel with no interaction between them. In a third view, *epiphenomenalism*, mental events are the by-products of bodily events but do not cause behavior. That is, bodily events cause mental events, but mental events cannot cause bodily events. During Watson's time, epiphenomenalism was probably the most commonly held view concerning the mind–body relationship. A fourth position, called *physical monism* (materialism), involved rejecting the existence of mental events (consciousness) altogether. In his early writings, Watson (1913) accepted consciousness as an epiphenomenon:

> Will there be left over in psychology a world of pure psychics, to use Yerkes' term? I confess I do not know. The plans that I most favor for psychology lead practically to the ignoring of consciousness in the sense that the term is used by psychologists today. I have virtually denied that this realm of psychics is open to experimental investigation. I don't wish to go further into the problem at present because it leads inevitably over into metaphysics. If you will grant the behaviorist the right to use consciousness in the same way as other natural scientists employ it—that is, without making consciousness a special object of observation—you have granted all that my thesis requires. (p. 174)

Later, in his debate with McDougall (discussed shortly), Watson switched to a physical monist position. Consciousness, he said, "has never been seen, touched, smelled, tasted, or moved. It is a plain assumption just as unprovable as the old concept of the soul" (Watson & McDougall, 1929, p. 14). Watson believed any approach to psychology that accepts the study of consciousness cannot be a science: "It is important to realize the vehemence and thoroughness with which the concept of consciousness is rejected [by Watson]. Mental processes, consciousness, souls, and ghosts are all of a piece, and are altogether unfit for scientific use" (Heidbreder, 1933, p. 235).

Lasting Influence. Watson's view of psychology was to have two long-lasting effects. First, he changed psychology's major goal from the description and explanation of states of consciousness to the prediction and control of behavior. Second, he made overt behavior the almost-exclusive subject matter of psychology. As Baars (1986) notes:

> Some of the central tenets of behaviorism are at this point so taken for granted that they have simply become part of standard experimental psychology. All modern psychologists restrict their *evidence* to observable behavior, attempt to specify stimuli and responses with the greatest possible precision, are skeptical of theories that resist empirical testing, and refuse to consider unsupported subjective reports as scientific evidence. In these ways, we are all behaviorists. (pp. viii–ix)

There are different types of behaviorists, however. Those psychologists who claim that mental events should be ignored represent radical behaviorism. More generally, **radical behaviorism** is the belief that an explanation of behavior cannot be in terms of unobserved internal events. All that can be directly observed are environmental events and overt behavior, and therefore only they should constitute the subject matter of a scientific analysis of behavior. Most psychologists—although they agree that the primary subject matter of psychology should be overt behavior—do not deny the importance of unobserved cognitive or physiological events in their analyses of behavior. For them behavior is used to *index* the cognitive or physiological events thought to be taking place within the organism. Such psychologists represent **methodological behaviorism**. The methodological behaviorist sees nothing wrong with postulating internal events but insists that such events be validated by studying their manifestations in overt behavior. Although methodological behaviorism would prove more popular than radical behaviorism, the latter does remain alive.

In 1957 the APA awarded Watson its prestigious gold medal in recognition of his significant contributions to psychology. Watson died in New York City on September 25, 1958, at the age of 80. In reviewing Watson's accomplishments, the influential philosopher of science Gustav Bergmann said that next to Freud, Watson was "the most important figure in the history of psychological thought during the first half of the century" (1956, p. 265). One of his most persistent adversaries was William McDougall.

WILLIAM MCDOUGALL: ANOTHER TYPE OF BEHAVIORISM

William McDougall (1871–1938) was born in Lancashire, England, where his father owned a chemical factory. Educated in private schools in England and Germany, McDougall entered the University of Manchester when he was only 15. Four years later, he started his medical training at Cambridge and then obtained his degree from St. Thomas's Hospital in London in 1897, at the age of 26. After a trip to the Far East, McDougall went to the University of Göttingen in Germany to study experimental psychology with the famous G. E. Müller (Chapter 9). However, it was the reading of William James's work that fueled McDougall's pursuit of psychology, and he always considered himself a disciple of James. After Germany, he accepted a position at University College in London to teach experimental psychology. While there, McDougall was instrumental in founding the British Psychological Society and the *British Journal of Psychology*. He moved to Oxford University in 1904 where he remained until World War I. During the war, he served as a major in the medical corps and was in charge of treating soldiers with mental problems. After the war, he was psychoanalyzed by Carl Jung.

In 1920 McDougall accepted an invitation from Harvard to become chair of the psychology department, a position once held by William James. Although McDougall was actually replacing Münsterberg, he perceived himself as replacing James, to whom he dedicated his book *An Outline of Psychology* (1923). McDougall stayed at Harvard until 1926, when he resigned his position. The following year, he moved to Duke University in North Carolina, where he remained until his death in 1938. In his lifetime, McDougall wrote 24 books and more than 160 articles.

Eight years after his arrival in the United States, McDougall still felt out of place and misunderstood. He tended to be disliked by his students, his colleagues, and the media. Part of the reason for his problems was his effort to promote a psychology that emphasized instinct in the increasingly anti-instinct climate of U.S. psychology. Other factors offered to

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William McDougall

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explain McDougall's plight include a generally anti-British sentiment in the United States in the 1920s; the fact that he had a pugnacious personality (see, Jones, 1987); the fact that he attempted to test Lamarck's theory of acquired characteristics when that theory had been largely discarded; his willingness to entertain the vitalistic belief that behavior is ultimately caused by a nonphysical force or energy; and his willingness to explore paranormal phenomena such as mental telepathy and clairvoyance, which culminated with his association with noted parapsychologist J. B. Rhine (1895–1980). Innis (2003) discusses McDougall's research projects, purposive psychology, and personality and the then prevailing U.S. psychology in order to explain why McDougall's life was characterized as "a major tragedy."

McDougall's Psychology

Although McDougall spent a great deal of time arguing with Watson, he was among the first to redefine psychology as the *science of behavior*. For example, in 1905, he said, "Psychology may be best and most comprehensively defined as the positive science of the conduct of living creatures" (p. 1). In his highly successful *An Introduction to Social Psychology* (1908), he elaborated the point:

> Psychologists must cease to be content with the sterile and narrow conception of their science as the science of consciousness, and must boldly assert its claim to be the positive science of the mind in all its aspects and modes of functioning, or, as I would prefer to say, the positive science of conduct or behaviour. Psychology must not regard the introspective description of the stream of consciousness as its whole task, but only as a preliminary part of its work. Such introspective description, such "pure psychology," can never constitute a science, or at least can never rise to the level of an explanatory science; and it can never in itself be of any great value to the social sciences. The basis required by all of them is a comparative and physiological psychology relying largely on objective methods, the observation of the behaviour of men and of animals of all varieties under all possible conditions of health and disease.… Happily this more generous conception of psychology is beginning to prevail. (p. 15)

Thus, at about the same time that Watson was making his first public statement of his behaviorism, McDougall was also questioning the value of introspection and calling for the objective study of the behavior of both humans and nonhuman animals. Unlike Watson, however, McDougall did not downplay the importance of mental events. McDougall thought that one could study such events objectively by observing their influence on behavior. According to our previous distinction between radical and methodological behaviorism, McDougall was a methodological behaviorist.

Purposive Behavior. The type of behavior McDougall studied was quite different from the reflexive behavior that the Russians and, in a more general way, Watson studied. McDougall (1923) studied purposive behavior, which differed from reflexive behavior in the following ways:

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- Purposive behavior is spontaneous. That is, unlike reflexive behavior, it need not be elicited by a known stimulus.
- In the absence of environmental stimulation, it persists for a relatively long time.
- It varies. Although the goal of purposive behavior remains constant, the behavior used to attain that goal may vary. If an obstacle is encountered, an alternative route is taken to reach the goal.
- Purposive behavior terminates when the goal is attained.
- Purposive behavior becomes more effective with practice. That is, the useless aspects of behavior are gradually eliminated. Trial-and-error behavior is purposive, not reflexive.

McDougall saw behavior as goal-directed and stimulated by some instinctual motive rather than by environmental events. He believed that any behaviorist who ignores the purposive nature of behavior is missing its most important aspect. McDougall referred to his position as **hormic psychology** (from the Greek word *horme*, meaning "urge").

Instincts

As we have seen, McDougall did not believe that purposive behavior is stimulated by the environment. Rather, it is stimulated by instinctual energy. A belief in instincts formed the core of McDougall's theory, and McDougall (1908) defined an instinct as

> an inherited or innate psycho-physical disposition which determines its possessor to perceive and to pay attention to objects of a certain class, to experience an emotional excitement of a particular quality upon perceiving such an object, and to act in regard to it in a particular manner, or, at least, to experience an impulse to such action. (p. 29)

According to McDougall, all organisms, including humans, are born with a number of instincts that provide the motivation to act in certain ways. Each instinct has three components:

- *Perception*. When an instinct is active, the person will attend to stimuli related to its satisfaction. For example, a hungry person will attend to food-related events in the environment.
- *Behavior*. When an instinct is active, the person will tend to do those things that will lead to its satisfaction. That is, the person will engage in goal-directed or purposive behavior until satisfaction is attained.
- *Emotion*. When an instinct is active, the person will respond with an appropriate emotion to those environmental events that are related to the satisfaction of or the failure to satisfy the instinct. For example, while hungry, a person will respond to food or food-related events (such as the odor of food) with positive emotions (like the feeling of happiness) and to those events that prevent satisfaction (not having any money) with negative emotions (sadness).

Although McDougall viewed instincts as ultimate motives, he believed they seldom, if ever, operate as singular tendencies. Rather, a single environmental event or a single thought tends to elicit several instinctual tendencies. For example, one's spouse may simultaneously elicit the parental and mating instincts. Other configurations of instincts may be elicited by the ideas of one's country, one's self, or one's job. When two or more instincts become associated with a single object or thought, a **sentiment** is said to exist. According to McDougall, most human social behavior is governed by sentiments, or configurations of instinctual tendencies. McDougall, then, was in agreement that most human behavior, no matter how complex, is ultimately instinctive.

McDougall (1908) was well aware of one major danger of explaining behavior in terms of instincts—the tendency to postulate an instinct for every type of behavior and then claim that the behavior has been explained:

> Lightly to postulate an indefinite number and variety of human instincts is a cheap and easy way to solve psychological problems and is an error hardly less serious and

> less common than the opposite error of ignoring all the instincts. (p. 88)

Similarly, "Attribution of the actions of animals to instincts … was a striking example of the power of a word to cloak our ignorance and to hide it even from ourselves" (1912, p. 138). Although McDougall's list of instincts varied through the years, the following is a sample of what he proposed in *Outline of Psychology* (1923): Escape, Combat, Repulsion, Parental, Mating, Curiosity, Submission, Assertion, Gregariousness, Food-Seeking, Hoarding, and Laughter.

The Battle of Behaviorism. At this point, we find two of the world's most famous psychologists taking opposite stands. On one hand, McDougall said that the instincts are the motivators of all animal behavior, including that of humans. Conversely, Watson said that instincts do not exist on the human level and that psychology should rid itself of the term *instinct*. Another major difference between Watson and McDougall concerned their views of the learning process. As we have seen, Watson rejected the importance of reinforcement in learning, saying that learning could be explained in terms of such associative principles as contiguity, frequency, and recency. For McDougall, habits of thought and behavior served the instincts; that is, they were formed because they satisfied some instinct. McDougall believed that reinforcement in the form of need reduction was an important aspect of the learning process.

The time was right for a debate between McDougall and Watson, and debate they did. On February 5, 1924, they confronted one another before the Psychological Club in Washington, DC, and more than 300 people attended. In 1929 Watson and McDougall published the proceedings under the title *The Battle of Behaviorism*. Space permits presenting only a small sample from their lengthy debate. Watson said,

> The Behaviorist cannot find consciousness in the test tube of his science. He finds no evidence anywhere for a stream of consciousness, not even for one so convincing as that described by William James. He does, however, find convincing proof of an ever-widening stream of behavior. (Watson & McDougall, 1929, p. 26)

McDougall's argumentative style is seen in his opening remarks in the debate:

> I would begin by confessing that in this discussion I have an initial advantage over Dr. Watson, an advantage which I feel to be so great as to be unfair; namely that all persons of common sense will of necessity be on my side….
>
> Dr. Watson's views are attractive to many persons … by reason of the fact that these views simplify so greatly the problems that lie before the student of psychology: they abolish at one stroke many tough problems with which the greatest intellects have struggled with only very partial success for more than two thousand years; and they do this by the bold and simple expedient of inviting the student to shut his eyes to them, to turn resolutely away from them, and to forget that they exist. (Watson & McDougall, 1929, pp. 40–44)

McDougall continued with an example concerning the enjoyment of music:

> I come into this hall and see a man on this platform scraping the guts of a cat with hairs from the tail of a horse; and, sitting silently in attitudes of rapt attention, are a thousand persons who presently break out into wild applause. How will [Watson] explain these strange incidents: How explain the fact that the vibrations emitted by the cat-gut stimulate all the thousand into absolute silence and quiescence; and the further fact that the cessation of the stimulus seems to be a stimulus to the most frantic activity? Common sense and psychology agree in accepting the explanation that the audience heard the music with

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> keen pleasure, and vented their gratitude and admiration for the artist in shouts and hand clappings. But [Watson] has relegated all such "metaphysical entities" to the dust heap, and must seek some other explanation. Let us leave him seeking it. The search will keep him harmlessly occupied.… (Watson & McDougall, 1929, pp. 62–63)

A vote taken after the debate showed McDougall to be the narrow victor. He believed that if the women in the audience had not voted almost unanimously for Watson, his margin of victory would have been much greater.

The audience notwithstanding, many psychologists certainly took exception to McDougall's instincts, and developed programs of research to discredit the concept. Among the more famous examples was the work of outspoken Chinese psychologist **Zing Yang Kuo (1898–1970)**. Born in Guangdong Province, Kuo completed his Ph.D. under Edward Tolman (Chapter 13) at the University of California at Berkeley in 1923, then returned home to found the psychology program at Fudan University. He would become a university administrator (Blowers, 2001), but also spent considerable time as a visiting professor in the United States.

Kuo's classic study involved the behavior of kittens interacting with rats under different experimental conditions. He was able to show that rat killing was not instinctual but based on life history. Like Watson and his infants, Kuo's kittens could "be made to kill a rat, to love it, to hate it, to fear it, or to play with it" (Kuo, 1930, p. 34).

On the other hand, McDougall was not the only one believing it to be folly to focus purely on observable behavior in animals and humans, and to remove subjective experience from psychology's domain. Nelson (1996) notes that radical behaviorism was even the subject of many jokes:

Zing Yang Kuo

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> For example, the first behaviorist says to the second behaviorist just after making love, "It was great for you, but how was it for me?" Although something important seems to be missing, this approach of ignoring participants' introspections about their own cognitions permeated the field. (p. 103)

McDougall concluded the preface to the 23rd edition of his *An Introduction to Social Psychology* (1936/2003) as follows:

> For myself I am more than ever convinced that these principles are valid, and that, after the lapse of some few years, when my name shall have been entirely forgotten, these principles will be generally accepted as main pillars of a psychology which will serve the indispensable basis of all the social sciences—provided our civilization shall contrive to endure so long a period. (p. xxii)

Neither Watson's nor McDougall's position has survived intact. For the moment, however, the student of psychology is far more likely to know about Watson than about McDougall. Whether this remains the case, only time will tell.

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SUMMARY

Several years before Watson's formal founding of the school of behaviorism, many psychologists already insisted that psychology be defined as the science of behavior. Several Russians, such as Sechenov, were calling for a completely objective psychology devoid of metaphysical speculation. It was Sechenov's discovery of inhibitory processes in the brain that allowed him to believe that all behavior, including that of humans, could be explained in terms of reflexes. During his research on digestion, Pavlov discovered "psychic reflexes" (conditioned reflexes). Pavlov saw all behavior, whether learned or innate, as reflexive. Innate associations between unconditioned stimuli (USs) and unconditioned responses (URs) were soon supplemented by learned associations between conditioned stimuli (CSs) and conditioned responses (CRs). Pavlov believed that some stimuli elicit excitation in the brain and other stimuli elicit inhibition. If a conditioned stimulus that was previously associated with an unconditioned stimulus is now presented without the unconditioned stimulus, extinction occurs. The facts that spontaneous recovery and disinhibition occur indicate that extinction is due to inhibition. If stimuli that elicit excitation on one hand and inhibition on the other are made increasingly similar, experimental neurosis results. According to Pavlov, conditioned stimuli act as signals announcing the occurrence of biologically significant events; he called such stimuli the first-signal system. Language allows symbols (words) to provide the same function as conditioned stimuli, such as when the word *fire* elicits defensive behavior. Pavlov called the words that symbolize physical events the second-signal system.

Bechterev also sought a completely objective psychology. Unlike Pavlov, who studied internal reflexes such as salivation, Bechterev studied overt behavior. Bechterev believed that his technique was superior to Pavlov's because it required no operation, it could be used easily on humans, it minimized unwanted reactions from the subject, overt behavior could be easily measured, and satiation was not a problem. Other influential Russian psychologists included Luria and Vygotsky.

Several factors molded Watson's behavioristic outlook. First, many of the functionalists at Chicago and elsewhere were studying behavior directly, without the use of introspection. Second, Loeb had shown that some of the behavior of simple organisms and plants was tropistic (an automatic reaction to environmental conditions). Third, animal research that related behavior to various experimental manipulations was becoming very popular. In fact, before his founding of the school of behaviorism, In 1913 Watson gave a lecture titled "Psychology as the Behaviorist Views It" at Columbia University. The publication of this lecture in the *Psychological Review* in 1913 marks the formal beginning of the school of behaviorism. In 1920 scandal essentially ended Watson's career as an academic psychologist, although afterward he published articles in popular magazines, spoke on radio, and revised some of his earlier works.

Watson found support for his position in Russian objective psychology and eventually made conditioning the cornerstone of his stimulus–response psychology. For Watson the goal of psychology is to predict and control behavior by determining how behavior is related to environmental events. Watson even viewed thinking as a form of behavior, consisting of minute movements of the tongue and larynx. Early in Watson's theorizing, instincts played a prominent role in explaining human behavior. Later, Watson said that humans possess instincts but that learned behavior soon replaces instinctive behavior. Watson's final position on instincts was that they have no influence on human behavior. He did say, however, that a person's physical structure is inherited and that the interaction between structure and environmental experience determines many personality characteristics. Also, the emotions of fear, rage, and love are inherited, and experience greatly expands the stimuli that elicit these emotions. The experiment with Albert showed the process by which previously neutral stimuli could come to elicit fear. Later, along with

Mary Cover Jones, Watson showed how fear could become disassociated from a stimulus.

The two major influences Watson had on psychology were (1) to change its goals from the description and understanding of consciousness to the prediction and control of behavior and (2) to change its subject matter from consciousness to overt behavior. Those psychologists who, like Watson, rejected internal events such as consciousness as causes of behavior were called radical behaviorists. Those who accepted internal events such as consciousness as possible causes of behavior but insisted that any theories about unobservable causes of behavior be verified by studying overt behavior were called methodological behaviorists.

One of Watson's most formidable adversaries was McDougall, who agreed with Watson that psychology should be the science of behavior but thought that purposive behavior should be emphasized. Because of its emphasis on goal-directed behavior, McDougall's position was referred to as hormic psychology. Although McDougall defined psychology as the science of behavior, he did not deny the importance of mental events, and he believed they could be studied through their influence on behavior. In other words, McDougall was a methodological behaviorist. Whereas Watson had concluded that instincts played no role in human behavior, McDougall made instincts the cornerstone of his theory. For McDougall an instinct is an innate disposition that, when active, causes a person to attend to a certain class of events, to feel emotional excitement when perceiving those events, and to act relative to those events in such a way as to satisfy the instinctual need. When the instinctual need is satisfied, the whole chain of events terminates. Thus, for McDougall, instincts and purposive behavior go hand in hand. McDougall believed that the reason humans learn habits is that they satisfy instinctual needs. Also, McDougall believed that instincts seldom, if ever, motivate behavior in isolation. Rather objects, events, and ideas tend to elicit two or more instincts simultaneously, in which case a sentiment is experienced. However, the Chinese psychologist Zing Yang Kuo was one of many who produced research against instinctual behavior.

DISCUSSION QUESTIONS

1. Make the case that prior to Watson's formulations, behaviorism was very much "in the air" in the United States.
2. Summarize Sechenov's argument that thoughts cannot cause behavior.
3. How, according to Sechenov, should psychological phenomena be studied?
4. What were the circumstances under which Pavlov discovered the conditioned reflex?
5. What did Pavlov mean by a cortical mosaic, and how was that mosaic thought to be causally related to behavior?
6. What observations led Pavlov to conclude that extinction is caused by inhibition?
7. How did Pavlov create experimental neurosis in his research animals, and how did he explain differential susceptibility to experimental neurosis?
8. Distinguish between the first- and second-signal systems, and then explain how those systems facilitate adaptation to the environment.
9. Summarize Bechterev's reflexology. Why did Bechterev believe that he was the first behaviorist?
10. How did Bechterev's method of studying conditioned reflexes differ from Pavlov's?
11. Describe the major experiences that steered Watson toward behaviorism.
12. According to Watson, what was the goal of psychology? How did this differ from psychology's traditional goal?
13. Summarize Watson's explanation of thinking.

14. What was Watson's final position on the role of instinct in human behavior?
15. Summarize Watson's views on emotion. What emotions did Watson think were innate? How do emotions become associated with various stimuli or events? What research did Watson perform to validate his views?
16. Describe the procedure that Watson and Mary Cover Jones used to extinguish Peter's fear of rabbits.
17. Summarize the advice that Watson and Watson gave on child rearing.
18. How did Watson explain learning?
19. Distinguish between radical and methodological behaviorism.
20. Summarize McDougall's hormic psychology. Why can his approach to psychology be called behavioristic? What type of behavior did he study, and what did he assume to be the cause of that behavior?
21. For McDougall, what were the characteristics of purposive behavior?
22. In their famous debate, what were the important points of disagreement between Watson and McDougall? If the debate were held today, for whom would you vote? Why?

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GLOSSARY

Association reflex Bechterev's term for what Pavlov called a conditioned reflex.

Bechterev, Vladimir (1857–1927) Like Pavlov, looked upon all human behavior as reflexive. However, Bechterev studied skeletal reflexes rather than the glandular reflexes that Pavlov studied.

Behavior therapy The use of learning principles in treating behavioral or emotional problems.

Behaviorism The school of psychology, founded by Watson, that insisted that behavior be psychology's subject matter and that psychology's goal be the prediction and control of behavior.

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Conditioned reflex A learned reflex.

Conditioned response (CR) A response elicited by a conditioned stimulus (CS).

Conditioned stimulus (CS) A previously biologically neutral stimulus that, through experience, comes to elicit a certain response (CR).

Cortical mosaic According to Pavlov, the pattern of points of excitation and inhibition that characterizes the cortex at any given moment.

Disinhibition The inhibition of an inhibitory process. Disinhibition is demonstrated when, after extinction, a loud noise causes the conditioned response to reappear.

Excitation According to Pavlov, brain activity that leads to overt behavior of some type.

Experimental neurosis The neurotic behavior that Pavlov created in some of his laboratory animals by bringing excitatory and inhibitory tendencies into conflict.

Extinction The elimination or reduction of a conditioned response (CR) that results when a conditioned stimulus (CS) is presented but is not followed by the unconditioned stimulus (US).

First-signal system Those objects or events that become signals (CSs) for the occurrence of biologically significant events, such as when a tone signals the eventuality of food.

Hormic psychology The name given to McDougall's version of psychology because of its emphasis on purposive or goal-directed behavior.

Inhibition The reduction or cessation of activity caused by stimulation, such as when extinction causes a conditioned stimulus to inhibit a conditioned response. It was Sechenov's discovery of inhibitory mechanisms in the brain that led him to believe that all human behavior could be explained in terms of brain physiology.

Kuo, Zing Yang (1898–1970) A Chinese psychologist that worked with kittens to show that rat killing was not instinctual.

Law of recency Watson's observation that typically it is the "correct" response that terminates a learning trial and it is this final or most recent response that will be repeated when the organism is next placed in that learning situation.

Luria, Alexander Romanovich (1902–1977) Russian psychologist noted for many diverse contributions, including conflict, traumatic brain injury, and memory.

McDougall, William (1871–1938) Pursued a type of behaviorism very different from Watson's. McDougall's behaviorism emphasized purposive and instinctive behavior. (*See also* **Hormic psychology**.)

Methodological behaviorism The version of behaviorism that accepts the contention that overt behavior should be psychology's subject matter but is willing to speculate about internal causes of behavior, such as various mental and physiological states.

Pavlov, Ivan Petrovich (1849–1936) Shared Sechenov's goal of creating a totally objective psychology. Pavlov focused his study on the conditioned and unconditioned stimuli that control behavior and on the physiological processes that they initiate. For Pavlov all human behavior is reflexive.

Radical behaviorism The version of behaviorism that claims only directly observable events, such as stimuli and responses, should constitute the subject matter of psychology. Explanations of behavior in terms of unobserved mental events can be, and should be, avoided.

Radical environmentalism The belief that most, if not all, human behavior is caused by environmental experience.

Reflexology The term Bechterev used to describe his approach to studying humans. Because he emphasized the study of the relationship between environmental events and overt behavior, he can be considered one of the earliest behaviorists, if not the earliest.

Sechenov, Ivan M. (1829–1905) The father of Russian objective psychology. Sechenov sought to explain all human behavior in terms of stimuli and physiological mechanisms without recourse to metaphysical speculation of any type.

Second-signal system The symbols of objects or events that signal the occurrence of biologically significant events. Seeing fire and withdrawing from it would exemplify the first-signal system, but escaping in response to hearing the word *fire* exemplifies the second-signal system.

Sentiment According to McDougall, the elicitation of two or more instinctual tendencies by the same object, event, or thought.

Spontaneous recovery The reappearance of a conditioned response after a delay following extinction.

Tropism The automatic orienting response that Loeb studied in plants and animals.

Unconditioned reflex An unlearned reflex.

Unconditioned response (UR) An innate response elicited by the unconditioned stimulus (US) that is naturally associated with it.

Unconditioned stimulus (US) A stimulus that elicits an unconditioned response (UR).

Vygotsky, Lev Semyonovich (1896–1934) Eclectic Russian psychologist best known for his work with child cognitive development and higher mental processes such as thought and language.

Watson, John Broadus (1878–1958) The founder of behaviorism who established psychology's goal as the prediction and control of behavior. In his final position, he denied the existence of mental events and concluded that instincts play no role in human behavior. On the mind–body problem, Watson finally became a physical monist, believing that thought is nothing but implicit muscle movement.

13

Neobehaviorism

POSITIVISM

As we saw in Chapter 5, several years after Auguste Comte first introduced **positivism**, the distinguished German physicist Ernst Mach argued for a more refined variation. In his *Contributions to the Analysis of Sensations* (1886/1914), Mach, agreeing with such British empiricists as Berkeley and Hume, asserted that all we can be certain of is our sensations. Sensations, then, would form the ultimate subject matter for any science, be it physics or psychology.

Likewise, one must not speculate about what exists beyond sensations nor attempt to determine their ultimate meaning. To do so is to enter the forbidden realm of metaphysical speculation. What a careful analysis of sensations can do is determine how they are correlated. Knowing which sensations tend to go together allows prediction, which in turn allows better adaptation to the environment. For Mach, then, a strong, pragmatic reason exists for the systematic study of sensations. For both Comte and Mach, scientific laws are statements that summarize experiences. Both sought, above all, to avoid metaphysical speculation, and both were, in that sense, radical empiricists. Remember that an empiricist believes that all knowledge comes from experience. Both argued for a close-to-the-data approach that avoids theorizing about what is observed. Echoing Francis Bacon, both believed that theorizing most likely introduces error into science. Thus, the best way to avoid error is to avoid theorizing.

John Watson and the Russian physiologists were positivists (although Pavlov did engage in considerable speculation concerning brain physiology). All emphasized objective data and avoided or minimized theoretical speculation. Watson's goals for psychology—predicting and controlling behavior—were very much in accordance with positivistic philosophy.

LOGICAL POSITIVISM

By the early 20th century, the Comtean and Machian goal of having sciences deal only with that which is directly observable was recognized as unrealistic. Physicists and chemists were finding such theoretical concepts as gravity, magnetism, atom, force, electron, and mass indispensable, although none of these entities could be observed directly. The problem was to find a way for science to use theory without encountering the dangers inherent in metaphysical speculation. The solution was provided by **logical positivism**. Logical positivism divided science into two major parts: the empirical and the theoretical. The **observational terms** of science refer to empirical events, and the **theoretical terms** attempt to explain that which is observed. By accepting theory as part of science, the logical positivists in no way reduced the importance of empirical observation. In fact, the ultimate authority for the logical positivist was empirical observation, and theories were considered useful only if they helped explain what was observed.

Logical positivism was the name given to the view of science developed by a small group of philosophers in Vienna (the Vienna Circle) around 1924. These philosophers took the older positivism of Comte and Mach and combined it with the rigors of formal logic. For them, abstract theoretical terms were allowed only if such terms could be logically tied to empirical observations. In his influential book *Language, Truth and Logic* (1936/1952), Alfred Ayer (1910–1989) summarized the position of the logical positivist as follows:

> The criterion which we use to test the genuineness of apparent statements of fact is the criterion of verifiability. We say that a sentence is factually significant to any given person, if, and only if, he knows how to verify the proposition which it purports to express—that is, if he knows what observations would lead him, under certain conditions, to accept the proposition as being true, or reject it as being false.… We enquire in every case what observations would lead us to answer the question, one way or the other; and, if none can be discovered, we must conclude that the sentence under consideration does not, as far as we are concerned, express a genuine question, however strongly its grammatical appearance may suggest that it does. (p. 35)

As we will see, logical positivism had a powerful influence on psychology. It allowed much more complex forms of behaviorism to emerge because it allowed theorizing without sacrificing objectivity. The result was that psychology entered into what Koch (1959) called the "age of theory" (from about 1930 to about 1950). Herbert Feigl, a member of the Vienna Circle, both named logical positivism and along with Rudolph Carnap did the most to bring it to the attention of U.S. psychologists. Of the American psychologists, S. S. Stevens (1935a, 1935b) was among the first to believe that if psychology followed the dictates of logical positivism, which he called "the science of science," it could at last be on par with physics. For this to happen, psychology would need to adhere to the principles of operationism.

Operationism and Physicalism

In 1927 Harvard physicist Percy W. Bridgman (1882–1961) published *The Logic of Modern Physics*, in which he elaborated Mach's proposal (see Chapter 5) that every abstract concept in physics be defined in terms of the procedures used to measure the concept. He called this an **operational definition**. Thus, concepts such as force and energy would be defined in terms of the operations or procedures followed in determining the quantity of force or energy present. In other words, operational definitions tie theoretical terms to observable phenomena. In this way, there can be no ambiguity about the definition of the theoretical term. The insistence that all abstract scientific terms be operationally defined was called **operationism**.

Along with logical positivism, operationism took hold in psychology almost immediately. Operational definitions could be used to convert theoretical terms like *drive*, *learning*, *anxiety*, and *intelligence* into empirical events and thus strip them of their metaphysical connotations. Such an approach was clearly in accordance with psychology's new emphasis on behavior. For example, learning could be operationally defined as making *x* number of successive correct turns in a T-maze, and anxiety and intelligence could be operationally defined as scores on appropriate tests. Such definitions were entirely in terms of publicly observable behavior; they had no excess "mentalistic" meaning. Most psychologists soon agreed with the logical positivists that unless a concept can be operationally defined, it is scientifically meaningless.

Unlike earlier positivism, logical positivism had no aversion to theory. In fact, one primary goal of logical positivism was to show how science could be theoretical without sacrificing objectivity. Once operationally defined, concepts could be related to one another in complex ways, such as the statements $F = ma$ (force equals mass times acceleration) and $E = mc^2$ (energy equals mass times a constant, the speed of light, squared). Because a scientific theory is evaluated in terms of the accuracy of its predictions, it is seen as self-correcting. If the deductions from a theory were experimentally confirmed, the theory gained strength; if its deductions were found to be incorrect, the theory was diminished and had to be revised or abandoned. No matter how complex a theory becomes, its ultimate function is to make accurate predictions about empirical events. By the late 1930s, logical positivism dominated U.S. experimental psychology.

One outcome of logical positivism was that all sciences were viewed as essentially the same. Because they all followed the same principles, made the same assumptions, and attempted to explain empirical observations, why should they not use the same terminology? It was suggested that a language database be created in which all terms would be defined in reference to publicly observable, physical objects and events. The push for unification of and a common vocabulary among the sciences (including psychology) was called **physicalism**. The proposal that all scientific propositions refer to physical things had profound implications for psychology:

> Innocent as this assertion about language may appear, it is charged with far-reaching implications for psychology. In fact, the examples used to illustrate Physicalism make it appear that the doctrine was aimed directly against psychology—at least against the kind peddled by philosophers.… All sentences purporting to deal with psychical states are translatable into sentences in the physical language. Two distinctly separate languages to describe physics and psychology are therefore not necessary.… It is the Logical Positivist's way of saying that psychology must be operational and behavioristic. (Stevens, 1951, pp. 39–40)

The "unity of science" movement and physicalism went hand in hand:

> How we get from Physicalism to the thesis of the *Unity of science* is obvious indeed. If every sentence can be translated into the physical language, then this language is an all-inclusive language—a universal language of science. And if the esoteric jargons of all the separate sciences can, upon demand, be reduced to a single coherent language, then all science possesses a fundamental logical unity. (Stevens, 1951, p. 40)

The science that was proposed as the model for this "unified science" was physics.

Neobehaviorism

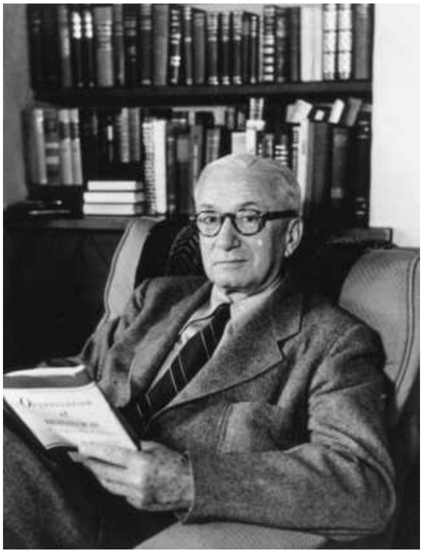
Neobehaviorism resulted when behaviorism was combined with logical positivism: "It is only a slight caricature to represent neobehaviorism as the product of the remarriage of psychology, in the guise of behaviorism, and philosophy, in the guise of logical positivism" (Toulmin & Leary, 1985, p. 603). Logical positivism made many forms of behaviorism possible: "Objectivism in data collection was one thing; agreement about specific modes of objectivism, and about the theoretical implications of 'objective' data, was something else" (p. 603). Although there were major differences among the neobehaviorists, they all tended to believe the following:

- If theory is used, it must be used in ways demanded by logical positivism.
- All theoretical terms must be operationally defined.
- Nonhuman animals should be used as research subjects for two reasons: (1) Relevant variables are easier to control than they are for human subjects. (2) Perceptual and learning processes occurring in nonhuman animals differ only in degree from those processes in humans; therefore, the information gained from nonhuman animals can be generalized to humans.
- The learning process is of prime importance because it is the primary mechanism by which organisms adjust to changing environments.

Most, but not all psychologists followed the new approach. During the period from about 1930 to about 1950, psychoanalysis (see Chapter 16) was becoming increasingly important in psychology, as was Gestalt psychology (see Chapter 14), and psychologists embracing these viewpoints saw little need to follow the dictates of logical positivism. Save these exceptions and a few others, however, the varieties of neobehaviorism dominated the period.

EDWIN RAY GUTHRIE

Edwin Ray Guthrie (1886–1959) was born in Lincoln, Nebraska, the first of five children. His father owned a piano shop, where he also sold bicycles and furniture. His mother had been a schoolteacher before her marriage. Academically inclined, he tackled Darwin's *Origin of Species* and *The Expression of the Emotions in Man and Animals* in the 8th grade, and read Xenophon in Greek (Prenzel-Guthrie, 1996).



Edwin Ray Guthrie

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Guthrie graduated from the University of Nebraska in 1907 with a BA in mathematics and a Phi Beta Kappa key. After graduation, he taught mathematics at a Lincoln high school while working toward an MA in philosophy at the University of Nebraska. He obtained his MA in 1910, then started work on his PhD at the University of Pennsylvania and, after obtaining it, returned in 1912 to teaching high school mathematics. In 1914 he accepted a position as instructor of philosophy at the University of Washington. In 1919 he became a member of the psychology department at the University of Washington, where he remained until accepting the position of dean of the graduate school in 1943. In 1951 Guthrie attained emeritus status but continued to teach and involve himself in university affairs until his retirement in 1956.

Guthrie's core work, *The Psychology of Learning*, was published in 1935 and revised in 1952. His writing was nontechnical, humorous, and filled with numerous homespun anecdotes. He believed strongly that any scientific theory, including his own, should be presented in such a way that it could be understood by college undergraduates. He also placed great emphasis on the practical application of his ideas. Although he had an experimental outlook and orientation, he, along with George P. Horton, performed only one experiment related to his theory (discussed shortly). Guthrie was clearly a behaviorist, but he argued with other behaviorists (such as Watson, Tolman, Hull, and Skinner), saying their theories were unparsimonious and too subjective. As we will see, Guthrie believed all learning phenomena could be explained by using only one of Aristotle's laws of association.

Guthrie's one law of learning was the **law of contiguity**, which he stated as follows: "A combination of stimuli which has accompanied a movement will on its recurrence tend to be followed by that movement. Note that nothing is here said about 'confirmatory waves' or reinforcement or pleasant effects" (1952, p. 23). In other words, according to Guthrie, what you do last in a situation is what you will tend to do if the situation recurs. Thus, Guthrie accepted Watson's recency principle.

In his last publication before his death, Guthrie (1959) revised his law of contiguity to read, "What is being noticed becomes a signal for what is being done" (p. 186). This was Guthrie's way of recognizing that an organism is confronted with so many stimuli at any given time that it cannot possibly form associations with all of them. Rather, the organism responds selectively to only a small proportion of the stimuli present, and it is that proportion that becomes associated with whatever response is made. How we select from the constant abundance of stimuli we are in fact aware of was a problem Thorndike had first recognized, and as we will see Guthrie was indebted to Thorndike's insights.

One-Trial Learning

Learning theorists prior to Guthrie accepted Aristotle's law of contiguity *and* his law of frequency. Common sense suggests that practice makes perfect—that is, the more we work at a task (cooking, playing a game, learning to ride a bicycle), the better we become. Likewise, Thorndike, Pavlov, Watson, and (as we will see later in this chapter) Tolman, Hull, and Skinner all believed that associative strength increases as a function of increased exposure to the learning environment. Of course, they disagreed in their explanation as to why an increase in associative strength took place, but they all agreed that frequency of exposure was necessary. What made Guthrie's theory of learning unique was his rejection of the law of frequency, saying instead that "a stimulus pattern gains its full associative strength on the occasion of its first paring with a response" (1942, p. 30). In other words, unlike any learning theorist before him, Guthrie postulated **one-trial learning**. As Guthrie was aware though, Aristotle had observed that learning can result from one experience. Aristotle said,

> It is a fact that there are some movements, by a single experience of which persons take the impress of custom more deeply than they do by experiencing others many times; hence upon seeing some things but once we remember them better than others which we may have seen frequently. (Barnes, 1984, Vol. 1, p. 717)

However, Aristotle believed such learning to be the exception and learning governed by the law of frequency to be the rule.

Why Practice Improves Performance. If learning occurs in one trial, why does practice appear to improve performance? To answer this question, Guthrie distinguished between *acts* and *movements*. A movement is a specific response made to a specific configuration of stimuli. It is this association that is learned at full strength after one exposure. An act is a response made to varying stimulus configurations. For example, typing the letter "a" on a specific typewriter under specific stimulus conditions (such as under certain lighting and temperature conditions, and in a specific bodily position) is a movement. However, typing "a" under varying conditions is an act. It is because learning an act involves learning a specific response under varying conditions that practice improves performance.

Just as an act consists of many movements, a *skill* consists of many acts. Thus, a skill such as typing, playing golf, or driving a car consists of many acts that, in turn, consist of thousands of movements. For example, the skill of playing golf consists of the acts of driving, putting, playing out of sand traps, and the like. Consider just putting. It involves

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gripping the club, swinging the club, taking an appropriate stance, remaining still, judging the speed, reading the slope and grain of the green, among many other factors. Assume Guthrie is correct that learning a movement—such as firmness of grip given a particular swing speed—is learned in one trial, it would still require thousands of putts to master the act and skill of putting. Again, it is the fact that acts and skills require the learning of so many S–R associations that their performance improves with practice.

The Nature of Reinforcement. According to Thorndike, cats gradually became more proficient at escaping from a puzzle box because each time they did so they experienced a "satisfying state of affairs" (reinforcement). Guthrie rejected this idea. Guthrie explained the effects of "reinforcement" in terms of the recency principle. He noted that when a cat in a puzzle box made a response that allowed it to escape (moving a pole, for example), the entire stimulus configuration in the puzzle box changed. Thus we have one set of stimuli existing before the pole is moved and another after it is moved. According to Guthrie, because moving the pole is the last thing the cat does under the prereinforcement conditions, it is that response the cat will make when next placed in the puzzle box. For Guthrie, "reinforcement" changes the stimulating conditions thereby preventing *unlearning*. In other words, "reinforcement" preserves the association that preceded it.

The only systematic research ever performed by Guthrie was done with Horton and was summarized in a small book titled *Cats in a Puzzle Box* (Guthrie & Horton, 1946). Guthrie and Horton observed approximately 800 escape responses by cats in an apparatus similar to that used by Thorndike (recall Figure 11.1). Like Thorndike, Guthrie and Horton observed that cats learned to move a pole to escape the apparatus. However, it was observed that each cat learned to move the pole in its own unique way. For example, one cat would hit the pole by backing into it, another would push it with its head, and another would move it with its paws. This *stereotyped behavior* would be repeated by each cat when it was replaced into the apparatus. This, of course, supported Guthrie's claim that whatever an animal does last in a situation will be repeated when the situation recurs (the recency principle). Moving the pole changes the stimulating conditions, thus preserving the association between the pre-escape conditions and the animal's characteristic response to those conditions. Guthrie's claim that reinforcement is merely a mechanical arrangement that prevents unlearning was confirmed.

Forgetting

According to Guthrie, not only does learning occur in one trial but so does forgetting. Forgetting occurs when an old S–R association is displaced by a new one. Thus, for Guthrie, all forgetting involves new learning. Forgetting occurs only if an existing S–R association is interfered with in some way. Guthrie explained,

> The child who has left school at the end of the seventh grade will recall many of the details of his last year for the rest of his life. The child who has continued on in school has these associations of the schoolroom and school life overlaid by others, and by the time he is in college may be very vague about the names and events of his seventh-grade experience.
>
> When we are somehow protected from established cues we are well aware that these may retain their connection with a response indefinitely. A university faculty member's wife recently visited Norway, the original home of her parents. She had not spoken Norwegian since the death of her grandmother when she was five and believed that she had forgotten the language. But during her stay in Norway, she astonished herself by joining in the conversation. The language and atmosphere of her childhood revived words and phrases she could not remember in her American home. But her conversation caused much amusement among her relatives because she was speaking with a facile

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> Norwegian "baby talk." If her family in America had continued to use Norwegian, this "baby talk" would have been forgotten, its association with the language destroyed by other phrases.
>
> Forgetting is not a passive fading of stimulus-response associations contingent upon the lapse of time, but requires active unlearning, which consists in learning to do something else under the circumstances. (1942, pp. 29–30)

Breaking Habits. A habit is an act that has become associated with a large number of stimuli. The more stimuli that elicit the act, the stronger is the habit. Smoking, for example, can be a strong habit because the act of smoking has become associated with so many stimuli. According to Guthrie, there is one general rule for breaking undesirable habits: Observe the stimuli that elicit the undesirable act and perform another act in the presence of those stimuli. For Guthrie, it was eating an apple when he would have lit a cigarette. Once this is done, the new, desirable act will be elicited by those stimuli instead of the old, undesirable act.

Punishment. For Guthrie, the effectiveness of punishment is determined not by the pain it causes but by what it causes the organism to do in the presence of stimuli that elicit undesirable behavior. If punishment elicits behavior incompatible with the undesirable behavior in the presence of these stimuli, it will be effective. If not, it will be ineffective. For example, in attempting to discourage a dog from chasing cars, hitting it on the nose while it is chasing is likely to be effective. On the other hand, hitting it on its rear is likely to be ineffective, or perhaps even strengthen the tendency to chase.

The Formalization of Guthrie's Theory

For Guthrie, drives provide **maintaining stimuli** that keep an organism active until a goal is reached. Maintaining stimuli can be internal (for example, hunger) or external (for example, a loud noise). When an organism performs an act that terminates the maintaining stimuli, that act becomes associated with the maintaining stimuli. That is, because of the recency principle, the last act performed in the presence of the maintaining stimuli will tend to be performed when those stimuli recur. Such acts are referred to as intentions because they appear to have as their goal the removal of maintaining stimuli (drives). In fact, however, "intentional" behavior is explained by Guthrie as any other kind of behavior—that is, by the law of contiguity.

In 1945 Guthrie was elected president of the APA, and in the same year, his alma mater the University of Nebraska awarded him an honorary doctorate. In 1958 the American Psychological Foundation (APF) awarded Guthrie its gold medal for distinguished contributions to the science of psychology. Shortly thereafter, the University of Washington named its new psychology building Edwin Ray Guthrie Hall. Guthrie died of a heart attack in April 1959.

Guthrie often presented his ideas in terms too general to be tested experimentally. An effort to make Guthrie's theory more scientifically rigorous was made by Virginia W. Voeks (1921–1989), who studied at the University of Washington when Guthrie was influential there. After receiving her BA from the University of Washington in 1943, Voeks went to Yale, where she was influenced by Hull. She obtained her PhD from Yale in 1947. In 1949 Voeks moved to San Diego State College, where she remained until her retirement in 1971.

Voeks's formalization of Guthrie's theory (1950) consisted of four basic postulates, eight definitions, and eight theorems (testable deductions). Voeks tested a number of her deductions and found considerable support for Guthrie's theory (see, for example, Voeks, 1954).

Another attempt to formalize Guthrie's theory was made by William Kaye Estes (1919–2011). Early in his career, Estes performed significant research on the effects of punishment (1944). However, it is for his development of *stimulus sampling theory* (SST) that Estes is best known (1950, 1960, 1964). The cornerstone of SST was Guthrie's law of contiguity with its assumption of one-trial learning. Estes' SST showed that Guthrie's theory, while appearing to be simple, was actually very sophisticated. The model that Estes created (SST) effectively dealt with that complexity and launched a highly heuristic research program. Estes eventually modified his own theory, making it more compatible with cognitive psychology (see, for example, Estes, 1994). Even through its various revisions, however, Guthrie's law of contiguity has remained at the core of Estes' theorizing.

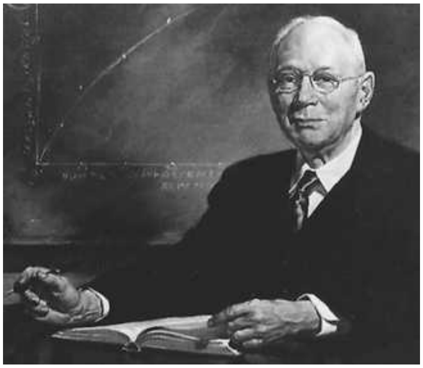
CLARK LEONARD HULL

Clark Leonard Hull (1884–1952) was born near Akron, New York, the son of an uneducated father and quiet mother who wed at the age of 15. It was Hull's mother who taught his father to read. Hull's education in a rural one-room school was often interrupted by chores on the family farm, although he still excelled in science and mathematics. After passing a teacher's examination at the age of 17, Hull later taught in a one-room school.

While in school, Hull contracted typhoid fever. Although several of Hull's fellow students died from the outbreak, he survived but, in Hull's opinion, with his memory impaired. After his recuperation, he went to Alma College in Michigan to study mining engineering. Following his training, he obtained a job with a mining company in Minnesota, where his task was to evaluate the manganese content in iron ore. After only two months on the job, at the age of 24, he contracted poliomyelitis, which left him partially paralyzed. At first he could walk only with crutches, and for the rest of his life he used a cane. Needing a career that was less strenuous than mining, Hull first considered becoming a Unitarian minister. He was attracted to Unitarianism because it was "a free, Godless religion," but the idea of "attending an endless succession of ladies' teas" caused him to abandon the idea. What he really wanted was to work in a field that would permit him to tinker with apparatus:

> [I wanted] an occupation in a field allied to philosophy in the sense of involving theory: one which was new enough to permit rapid growth so that a young man would not need to wait for his predecessors to die before his work could find recognition, and one which would provide an opportunity to design and work with automatic apparatus. Psychology seemed to satisfy this unique set of requirements. (Hull, 1952a, p. 145)

Although Hull set a career in psychology as his goal, he was not financially able to pursue it. Instead, he became principal of the school he had attended as a child (which had expanded to two rooms). In his spare time, he read James's *Principles* to prepare himself for his chosen profession. After two years, he had saved enough money to enter the University of Michigan as a junior. Among the courses that Hull took at Michigan was one in experimental psychology, which he loved, and one in logic, for which he constructed a machine that could simulate syllogistic reasoning. After graduation from the University of Michigan, Hull's funds were again exhausted, and he accepted a position in a school of education in Kentucky. During this time, although not yet in graduate school, he began planning what would become his doctoral dissertation on concept formation. Hull applied for graduate study at Cornell and Yale (where he ultimately would spend most of his professional career) and was rejected by both. He was, however, accepted at the University of Wisconsin, where he completed his dissertation on concept learning.



Clark Leonard Hull

© Deane Keller, "Dr. Clark Leonard Hull (1884–1952), M.A. (Hon.) 1929" Yale University Art Gallery, Gift of Colleagues, friends and students of the sitter.

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Although Hull believed that his research represented a breakthrough in experimental psychology, it was essentially ignored. Hilgard (1987) reminisced on Hull's experiences:

> Hull had struggled hard to complete his dissertation, undergoing the trials of a baby daughter smearing the ink on charts he had so carefully laid out to dry, so that he had to do them all over again. He felt proud of his dissertation because it moved experimental psychology into the area of thought processes by investigating the learning of concepts.… He told me how downcast he had become when year after year no one paid attention to it or cited it. He was finally prepared to accept the fact that it had been "still-born" (his words). (p. 200)

Hull received his doctorate from Wisconsin in 1918 and remained there as an instructor until 1929. Perhaps disappointed over the reception of his dissertation research on concept learning, Hull moved into other research areas. For example, he accepted a research grant to study the influence of pipe smoking on mental and motor performance. Next, Hull was asked to teach a course in psychological tests and measurements. He observed that the existing bases for vocational guidance were not objective, and his efforts to improve the situation ultimately resulted in his book *Aptitude Testing* (1928). As part of his work in this area, Hull invented a machine that could automatically compute intercorrelations among test scores. This machine, which was programmed by punching holes in a tape, is now housed in the Smithsonian Institution in Washington, DC (Hilgard, 1987). In addition to his contributions to concept learning and aptitude testing, Hull also studied suggestibility and hypnosis while at Wisconsin. Over about a 10-year period, Hull and his students published 32 papers on these topics. This work culminated in Hull's *Hypnosis and Suggestibility: An Experimental Approach* (1933).

In 1929 Hull accepted a professorship at Yale University (one of the institutions that rejected his graduate school application). At Yale, Hull pursued two interests: the creation of machines that could learn and think (like his correlation machine) and the study of the learning process. Hull (1930) even believed

> It should be a matter of no great difficulty to construct parallel inanimate mechanisms, even from inorganic materials, which will genuinely manifest the qualities of intelligence, insight, and purpose, and which, insofar, will be truly psychic. (p. 256)

A bit ahead of his time then, Hull is today seen as a forerunner of artificial intelligence (Chapter 19) based on his interests in machine learning. Juxtaposing machines with learning was entirely compatible for Hull, because he viewed humans as machines that learn and think. Not surprisingly, one of Hull's heroes was Newton, who viewed the universe as a huge machine that could be described in precise mathematical terms. Hull simply applied the Newtonian model to living organisms. Another of Hull's heroes was Pavlov. Hull was deeply impressed by the English translation of Pavlov's work that appeared in 1927. He began studying conditioned responses in humans while he was still at Wisconsin and continued his studies when he moved to Yale. At Yale, however, his experimental subjects were rats instead of humans.

Hull's many contributions were recognized when, in 1936, he served as 44th president of the APA. In his presidential address, he outlined his goal of creating a theoretical psychology that would explain "purposive" behavior in terms of mechanistic, lawful principles. In creating his theoretical psychology, Hull would employ the tenets of logical positivism (and Euclidean geometry) in that new knowledge is deduced from what is already known. In his autobiography, Hull said, "The study of geometry proved to be the most important event of my intellectual life; it opened to me an entirely new world—the fact that thought itself could generate and really prove new relationships from previously possessed elements" (1952a, p. 144).

Like Watson, Hull believed that psychology's preoccupation with consciousness was derived from medieval metaphysics and theology. Although Hull's interest in "psychic machines" was now secondary, he did demonstrate such a machine to his APA audience, and he expressed the belief that if a machine could be built that performed adaptive behaviors, it would support his contention that the adaptive behaviors of living organisms could be explained in terms of mechanistic principles.

Hull was a methodological behaviorist, and employed logical positivism in his theorizing. Philosophically, however, Hull was a mechanist and a materialist. Supporters of Hull's mechanistic behaviorism and those of Tolman's purposive behaviorism (considered later in the chapter) battled with each other throughout the 1930s and 1940s. This running debate resulted in one of the most productive periods in psychology's history.

Between 1929 and 1950, Hull wrote 21 theoretical articles in the *Psychological Review*, and in 1940 he (with coauthors Hovland, Ross, Hall, Perkins, and Fitch) published *Mathematico-Deductive Theory of Rote Learning*. This book was an effort to show how rote learning could be explained in terms of conditioning principles. In 1943 Hull published *Principles of Behavior*, one of the most influential books in psychology's history; and *A Behavior System* (1952b) extended the ideas found in *Principles* to more complex phenomena. In 1948, while preparing the manuscript for *A Behavior System*, Hull suffered a massive heart attack that exacerbated his already frail physical condition. It took all the strength he could muster, but he finished the book four months before he died, on May 10, 1952, of another heart attack. Near his death, Hull expressed profound regret that a third book he had been planning would never be written. He believed that his third book would have been his most important because it would have extended his system to human social behavior.

Hull's Hypothetico-Deductive Theory

Hull and his disciples were the first (and perhaps last) psychologists to attempt to create a **hypothetico-deductive theory** of learning. Hull first reviewed the research that had been done on learning; then he summarized that research in the form of general statements, or postulates. From these postulates, he inferred theorems that yielded testable propositions. Hull (1943) explained why such a system should be self-correcting:

> Empirical observation, supplemented by shrewd conjecture, is the main source of the primary principles or postulates of a science. Such formulations, when taken in various combinations together with relevant antecedent conditions, yield inferences or theorems, of which some may agree with the empirical outcome of the conditions in question, and some may not. Primary propositions yielding logical deductions which consistently agree with the observed empirical outcome are retained, whereas those which disagree are rejected or modified. As the sifting of this trial-and-error process continues, there gradually emerges a limited series of primary principles whose joint implications are progressively more likely to agree with relevant observations. Deductions made from these surviving postulates, while never absolutely certain, do at length become highly trustworthy. This is in fact the present status of the primary principles of the major physical sciences. (p. 382)

Whereas Watson believed that all behavior could be explained in terms of the associations between stimuli and responses, Hull concluded that a number of intervening internal conditions had to be taken into consideration. For Hull, the intervening events were primarily physiological and linked to innate drives and needs. As such, Hull's theory can be seen as an elaboration of Woodworth's S–O–R concept. Using operational definitions, Hull attempted to show how a number of internal events interact to cause overt behavior. Hull's theory then is also in the Darwinian tradition because it associates reinforcement with those events that are conducive to an organism's survival.

In Hull's final statement of his theory (1952b), he listed 17 postulates and 133 theorems, but we review only a few of his more important concepts here.

Reinforcement

Unlike Watson (and Tolman), Hull was a reinforcement theorist. For Hull, a biological need creates a *drive* in the organism, and the diminution of this drive constitutes **reinforcement**. Thus, Hull had a **drive-reduction** theory of reinforcement. For Hull drive is one of the important events that intervenes between a stimulus and a response.

If a response made in a certain situation leads to drive reduction, **habit strength** ($_SH_R$) is said to increase. Hull operationally defined habit strength, an intervening variable, as the number of reinforced pairings between an environmental situation (S) and a response (R). For Hull an increase in habit strength constitutes learning.

Drive is not only a necessary condition for reinforcement but also an important energizer of behavior. Hull called the probability of a learned response **reaction potential** ($_SE_R$), which is a function of both the amount of drive (D) present and the number of times the response had been previously reinforced in the situation. Hull expressed this relationship as follows:

$$_SE_R = {_SH_R} \times D$$

If either $_SH_R$ or D is zero, the probability of a learned response being made is also zero.

Hull postulated several other intervening variables, some of which contributed to $_SE_R$ and some of which diminished it. The probability of a learned response is the net effect of all these positive and negative influences, each intervening variable being carefully operationally defined. For a more detailed account of Hull's theory, see Bower and Hilgard (1981).

Hull's Influence

Within 10 years of the publication of *Principles of Behavior* (1943), 40% of all experimental studies in the highly regarded *Journal of Experimental Psychology* and *Journal of Comparative and Physiological Psychology* referred to some aspect of Hull's theory. The figure increases to 70% when only the fields of learning and motivation are considered (Spence, 1952). Hull's influence went beyond these areas, however; during the period between 1949 and 1952, there were 105 references to Hull's *Principles of Behavior* in the *Journal of Abnormal and Social Psychology*, compared to only 25 for the next most commonly cited work (Ruja, 1956).

In 1945 Hull was awarded the prestigious Warren Medal by the Society of Experimental Psychologists. It carried this inscription:

> To Clark L. Hull: For his careful development of a systematic theory of behavior. This theory has stimulated much research and it has been developed in a precise and quantitative form so as to permit predictions which can be tested empirically. The theory thus contains within itself the seeds of its own ultimate verification and of its own possible final disproof. A truly unique achievement in the history of psychology to date. (Kendler, 1987, p. 305)

Given his long period of dominance over U.S. psychology, there were many well-known disciples and students of Hull. For example, throughout this text we have cited one of psychology's most able historians, and the 1949 APA President, Ernest Hilgard (1904–2001). Hilgard got his start in the field at Yale, just as Hull was establishing his program. Another APA President (1963), Charles Osgood (1916–1991) also got his start at Yale before earning his fame as creator of the semantic differential—a way of understanding the linguistic meaning of concepts. O. Herbart Mowrer (1907–1982; APA President 1954) survived the sizable scandal following his misbegotten undergraduate research project on sexuality at Missouri and went on to Johns Hopkins to complete his PhD with Watson's erstwhile colleague, Knight Dunlap. From there Mowrer joined Hull's team at Yale, which soon included notables such as Robert Sears (Chapter 10), Carl Hovland (Chapter 19), and Neal Miller (below).

After Hull's death in 1952, one of his former students, Kenneth W. Spence (1907–1967), became the major spokesman for his theory (see Spence, 1956, 1960). The extensions and modifications Spence made in Hull's theory were so substantial that the theory became known as the Hull–Spence theory. So successful was Spence in perpetuating Hullian theory that a study showed that as late as the 1960s, Spence was the most cited psychologist in experimental psychology journals, with Hull himself still in eighth place (Myers, 1970). In recent years, Hull's grand theory has largely given way to the goal of developing hypotheses designed to explain specific phenomena (see, for example, Amsel, 1992; Rashotte & Amsel, 1999).

Neal Miller (1909–2002; APA President, 1961) also made important, if very different extensions. Miller completed his PhD from Yale in 1935, working under Hull. After a stint at the Vienna Psychoanalytic Institute to study Freud, he returned to Yale where he remained for many years. Frequently writing in collaboration with the sociologist John Dollard (1900–1980), Miller developed a simplified version of Hull's system which he applied to personality, psychopathology, and various social phenomena such as conflict and aggression. His key works included *Social Learning and Imitation* (Miller & Dollard, 1941) and *Personality and Psychotherapy* (Dollard & Miller, 1950). In 1966 Miller left Yale and focused his attentions on the physiology of behavior, conducting research that would provide a foundation for later work in biofeedback.

Although Hull's theory eventually "won" its battle with Tolman's and was extremely popular in the 1940s and 1950s—and under Spence's (and Miller's) influence, even into the 1960s—it eventually "lost" to the simpler and more pragmatic behavioral approach offered by Skinner (next). Hull attempted to create a general behavior theory that all social sciences could use to explain human action, and his program fit all the requirements of logical positivism (for example, all his theoretical concepts were operationally defined). However, although Hull's theory was scientifically respectable, it was relatively sterile. More and more, the testable deductions from his theory were criticized for being of little value in explaining behavior beyond the laboratory. Psychologists began to feel hampered by the need to define their concepts operationally and to relate the outcomes of their experiments to an ever more complex grand theory such as Hull's.

B. F. SKINNER

As the complex theoretical system of Hull began to lose popularity, another form of behaviorism was in its ascendancy: The version promoted by B. F. Skinner. As we will see, Skinner's brand of behaviorism was more in accordance with positivism than with logical positivism. After World War II, Skinner's behaviorism began rivaling all other versions, and in time would surpass them.

Burrhus Frederic Skinner (1904–1990) was born in Susquehanna, Pennsylvania, into a warm, stable, middle-class family. Skinner had a younger brother who was a better athlete and more socially popular than he was but who died suddenly at the age of 16. Skinner was raised according to strict moral standards but was physically punished only once:

> I was never physically punished by my father and only once by my mother. She washed my mouth out with soap and water because I had used a bad word. My father never missed an opportunity, however, to inform me of the punishments which were waiting if I turned out to have a criminal mind. He once took me through the county jail, and on a summer vacation I was taken to a lecture with colored slides describing life in Sing Sing. As a result I am afraid of the police and buy too many tickets to their annual dance. (Skinner, 1967, pp. 390–391)

In high school, Skinner did well in literature but poorly in science, and he earned money by playing in a jazz band and with an orchestra. He went to Hamilton College, a small liberal arts school in New York, where he majored in English. Skinner did not fit well into college life, was terrible at sports, and felt "pushed around" by requirements such as daily chapel. By his senior year, Skinner viewed himself as "in open revolt" against the

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B. F. Skinner

school. He, along with a friend, decided to play a trick on their English composition professor, whom they disliked because he was "a great name-dropper." Skinner and his friend had posters printed that read: "Charles Chaplin, the famous cinema comedian, will deliver his lecture 'Moving Pictures as a Career' in the Hamilton College chapel on Friday, October 9" (Skinner, 1967, p. 393). The Chaplin visit was said to be under the auspices of the disliked English professor. The posters were displayed all over town, and Skinner's friend called the newspaper in Utica with the news. By noon the prank was completely out of hand. Police roadblocks were necessary to control the crowds. The next day, the English professor to whom the hoax was directed wrote an editorial lambasting the entire episode. Skinner said that it was the best thing the professor ever wrote. The Chaplin prank was only the beginning of a mischievous senior year for Skinner:

> As a nihilistic gesture, the hoax was only the beginning. Through the student publications we began to attack the faculty and various local sacred cows. I published a parody of the bumbling manner in which the professor of public speaking would review student performances at the end of the class. I wrote an editorial attacking Phi Beta Kappa. At commencement … I covered the walls with bitter caricatures of the faculty … and we [Skinner and his friends] made a shambles of the commencement ceremonies, and at intermission the President warned us sternly that we would not get our degrees if we did not settle down. (Skinner, 1967, p. 393)

Skinner graduated from Hamilton College with a bachelor's degree in English literature and a Phi Beta Kappa key and without having had a course in psychology. He left college with a passion to become a writer. This passion was encouraged in part by the fact that the famous poet Robert Frost favorably reviewed three of his short stories. Skinner's first attempt at writing was in the attic of his parents' home: "The results were disastrous. I frittered away my time. I read aimlessly … listened to the newly invented radio, contributed to the humorous column of a local paper but wrote almost nothing else, and thought about seeing a psychiatrist" (Skinner, 1967, p. 394). Next, Skinner tried writing in New York City's Greenwich Village and then in Paris for a summer; these attempts also failed. By this time, Skinner (1967) had developed a distaste for most literary pursuits: "I had failed as a writer because I had had nothing important to say, but I could not accept that explanation. It was literature which must be at fault" (p. 395).

Having failed to describe human behavior through literature, Skinner decided to describe it scientifically. While in Greenwich Village, Skinner had read the works of Pavlov and Watson and was greatly impressed. On his return from Europe in 1928, he enrolled in the graduate program in psychology at Harvard. Feeling that he at last found his niche, Skinner threw himself completely into his studies:

> I would rise at six, study until breakfast, go to classes, laboratories, and libraries with no more than fifteen minutes unscheduled

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> during the day, study until exactly nine o'clock at night and go to bed. I saw no movies or plays, seldom went to concerts, had scarcely any dates and read nothing but psychology and physiology. (Skinner, 1967, p. 398)

This high degree of self-discipline typified Skinner's work habits throughout his long life.

Skinner earned his master's degree in two years (1930), and his doctorate the next (1931), and then remained at Harvard for five more years as a postdoctoral fellow. Skinner began his teaching career at the University of Minnesota in 1937 and remained there until 1945. While he was at Minnesota, Skinner published *The Behavior of Organisms* (1938), which established him as a nationally prominent experimental psychologist.

In 1945 Skinner moved to Indiana University as chairman of the psychology department, where he remained until 1948 when he returned to Harvard. At Indiana, Skinner overlapped with others that would flourish during the heyday of American behaviorism, including the aforementioned William Estes, Jacob Robert Kantor (1888–1984), Winthrop Kellogg (an animal psychologist who raised a chimp alongside his son), and William Verplanck (cofounder of the prestigious Psychonomic Society). Like Watson, Kantor developed his "interbehaviorism" out of his graduate studies at Chicago. Interbehaviorism sought to align psychology with the objective methods of the natural sciences but focused more on social behavior and language. Variations on Kantor's approach are still used in modern behavior therapy, and were associated with the "ecological" approach of other psychologists such as J. J. Gibson (Chapter 6) and Roger Barker.

It was during his time at Indiana that Skinner built his infamous "baby-tender" and wrote his utopian novel—*Walden Two*. Following the birth of his second daughter, Deborah, Skinner made a "crib-sized living space [with] sound-absorbing walls and a large picture window. Air entered through filters at the bottom … and around the edges of a tightly stretched canvas, which served as a mattress. A strip of sheeting ten yards long passed over the canvas, a clean section of which could be cranked into place" (Skinner, 1979, p. 275). Although he initially failed to get General Mills to mass-produce the invention, he did publish an article about it in *Ladies Home Journal*, and some years later they were manufactured for sale by the Aircrib Corporation. As for the novel, it describes the benefits of a society based on behavioral principles, as advocated by its founder—Frazier. Over his lifetime, sells were good, with almost 2,500,000 copies sold by 1990.

After Indiana, Skinner remained affiliated with Harvard until his death in 1990. In 1974 he became professor emeritus

> but continued for years to walk the two miles between his home and his office in William James Hall to answer correspondence, to meet with scholars who paid him visits from around the world, and on occasion to conduct research and supervise graduate students. (Fowler, 1990, p. 1203)

In addition to the short autobiography Skinner wrote in 1967, he described the details of his life in three more extensive volumes: *Particulars of My Life* (1976), *The Shaping of a Behaviorist* (1979), and *A Matter of Consequences* (1983).

Skinner's Positivism

In Chapter 4, we discussed the great Renaissance thinker Francis Bacon. Bacon was intensely interested in overcoming the mistakes of the past and thus arriving at knowledge that was free of superstition and prejudice. His solution to the problem was to stay very close to what was empirically observable and to avoid theorizing about it. Bacon proposed that science be descriptive and inductive rather than theoretical and deductive. Following Bacon's suggestion, scientists would first gather empirical facts and then infer knowledge from those facts (instead of first developing abstract theories from which facts are deduced). Bacon's main point was that in the formulation of theories, a scientist's biases, misconceptions, traditions, and beliefs (perhaps false beliefs) could manifest themselves and that these very things inhibited a search for objective knowledge. Skinner was deeply impressed by Bacon and often referred to his influence on his life and work (L. D. Smith, 1992).

Bacon can be seen as a forerunner to the positivistic traditions of Comte and then Mach. As he did with Bacon, Skinner often acknowledged a debt to Mach (see, for example, Skinner, 1931/1972, 1979). For Mach, as we have previously noted, it was important that science rid itself of metaphysical concepts, which, for him, were any concepts that refer to events that cannot be directly observed (such as causation). Mach and the other positivists were interested only in facts and how facts are related to each other. According to Mach, the scientist determines how facts are related by doing a functional analysis. That is, by noting that if *X* occurs, *Y* also tends to occur. To ponder why such relationships exist is to enter the dangerous and unnecessary realm of metaphysics. The job of science is to describe empirical relationships, not explain them. Skinner followed Mach's positivism explicitly. By adopting Mach's functional approach to science, Skinner (1931/1972) avoided the complex problem of establishing causation in human behavior:

> We may now take the more humble view of explanation and causation which seems to have been first suggested by Mach and is now a common characteristic of scientific thought, wherein … the notion of function [is] substituted for that of causation. (pp. 448–449)

So, as far as theory is concerned, Skinner was a positivist, not a logical positivist.

Functional Analysis of Behavior. Like Watson, Skinner denied the existence of a separate realm of conscious events. He believed that what we call mental events are simply verbal labels given to certain bodily processes: "[My] position can be stated as follows: What is felt or introspectively observed is not some nonphysical world of consciousness, mind or mental life but the observer's own body" (Skinner, 1974, p. 17). But, said Skinner, even if there were mental events, nothing would be gained by studying them. He reasoned that if environmental events give rise to conscious events, which, in turn, cause behavior, nothing is lost and a great deal is gained by simply doing a **functional analysis** of the environmental and the behavioral events. Such an analysis avoids the many problems associated with the study of mental events. These so-called mental events, said Skinner, will someday be explained when we learn which internal physiological events people are responding to when they use such terms as *thinking*, *choosing*, and *willing* to explain their own behavior. Skinner, then, was a physical monist (materialist) because he believed that consciousness as a nonphysical entity does not exist. Because we do not at present know to which internal events people are responding when they use mentalistic terminology, we must be content simply to ignore such terms. Skinner (1974) said,

> There is nothing in a science of behavior or its philosophy which need alter feelings or introspective observations. The bodily states which are felt or observed are acknowledged, but there is an emphasis on the environmental conditions with which they are associated and an insistence that it is the conditions rather than the feelings which enable us to explain behavior. (p. 245)

Skinner (1974) also said, "A completely independent science of subjective experience would have no more bearing on a science of behavior than a science of what people feel about fire would have on the science of combustion" (pp. 220–221), and "There is no place in the scientific position for a self as a true originator or initiator of action" (p. 225). Like Watson then, Skinner was a radical behaviorist in that he refused to acknowledge any causal role of mental events in human conduct. For Skinner, so-called mental events were nothing but neurophysiological events to which we have assigned mentalistic labels.

Skinner continued to attack cognitive psychology throughout his professional life, and toward the end of his life, he deeply regretted the increased popularity of cognitive psychology.

Operant Behavior

Whereas Watson modeled his psychology after the Russian physiologists, Skinner modeled his after Thorndike. Watson and Pavlov attempted to correlate behavior with environmental stimuli. That is, they were interested in reflexive behavior. Skinner called such behavior **respondent behavior** because it was elicited by a known stimulus. Given that both Pavlov and Watson studied the relationship between environmental stimuli (S) and responses (R), their endeavors represent **S–R psychology**. Thorndike, however, studied behavior that is controlled by its consequences. For example, behavior that had been instrumental in allowing an animal to escape from a puzzle box tends to be repeated when the animal is next placed in the puzzle box. Using Thorndike's experimental arrangement, a response was instrumental in producing certain consequences, and therefore the type of learning that he studied was called **instrumental conditioning**. Thorndike neither knew nor cared about the origins of the behavior, only that it is controlled by its consequences. What Thorndike called instrumental behavior, Skinner called **operant behavior** because it operates on the environment in such a way as to produce consequences. Unlike respondent behavior, which is elicited by known stimulation, operant behavior is simply *emitted* by the organism. It is not that operant behavior is not caused but that its causes are not important. The important aspect of operant behavior is that it is controlled by its consequences. Skinner's focus on operant behavior made his brand of behaviorism very different from Watson's.

Although both Skinner and Thorndike studied behavior controlled by its consequences, *how* they studied behavior differed. Thorndike measured how long it took an animal to make an escape response as a function of successive, reinforced trials. He found that as the number of reinforced escapes increases, the time it takes for the animal to escape decreases. His dependent variable was the latency of the escape response. Skinner's procedure was to allow an animal to respond freely in an experimental chamber (called a Skinner box) and to note the effect of reinforcement on response rate. For example, a lever-press response may occur only 2 or 3 times a minute before it is reinforced and 30 or 40 times a minute when it results in reinforcement. Rate of responding, then, was Skinner's primary dependent variable.

Based on this work, several schedules of reinforcement were identified. These include variable interval schedules, such as a teacher that calls on students in class. Not knowing when they might be called on (the variable interval), students need to remain on task in order to be reinforced. In contrast, there are also fixed interval schedules, such as how students behave as the end of a class period nears. Have you ever noticed that in a class that always runs until the end of the period that students close their books and start to fidget in advance of being dismissed? After a period of no opportunity for reinforcement, a flurry of behavior comes just before and at the fixed interval. Besides time intervals, schedules can be understood as ratios of behavior to reinforcement. For example, when you use a vending machine, you know how many quarters to use before you get your food—that is, the ratio between the behavior (putting in a quarter) and getting your reward is fixed, so it is unlikely you would under or over respond. And last, there are variable ratios—such as slot machines. In this case, you do not know how many quarters you will need to put in before a pay out, and as such behavior will be repeated often.

Despite the differences between them, however, both Watson and Skinner exemplified radical behaviorism because they believed that behavior could be completely explained in terms of events external to the organism. For Watson, environmental events elicit either learned or unlearned responses; for Skinner, the environment selects behavior via reinforcement contingencies. For both, what goes on within the organism is relatively unimportant. In contrast, Hull exemplified methodological behaviorism because he postulated a wealth of events that were supposed to intervene between experience and behavior.

The Nature of Reinforcement

If an operant response leads to reinforcement, the rate of that response increases. Thus, those responses an

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organism makes that result in reinforcement are more likely to recur when the organism is next in that situation. This is what is meant by the statement that operant behavior is controlled by its consequences. According to Skinner, reinforcement can be identified only through its effects on behavior. Just because something acts as a reinforcer for one organism under one set of circumstances does not mean that it will be a reinforcer for another organism or for the same organism under different circumstances:

> In dealing with our fellow men in everyday life and in the clinic and laboratory, we may need to know just how reinforcing a specific event is. We often begin by noting the extent to which our own behavior is reinforced by the same event. This practice frequently miscarries; yet it is still commonly believed that reinforcers can be identified apart from their effects upon a particular organism. As the term is used here, however, the only defining characteristic of a reinforcing stimulus is that it reinforces. (Skinner, 1953, p. 71)

Thus, for Skinner, there is no talk of drive reduction, satisfying states of affairs, or any other mechanisms of reinforcement. A reinforcer is *anything* that, when made contingent on a response, changes the rate with which that response is made. For Skinner, nothing additional needs to be said. He accepted Thorndike's law of effect but not the mentalism that the phrase "satisfying state of affairs" implies.

The Importance of the Environment. Whereas the environment was important for Watson and the Russian physiologists because it elicited behavior, it was important for Skinner because it *selected* behavior. The reinforcement contingencies the environment provides determine which behaviors are strengthened and which are not. Change reinforcement contingencies, and you change behavior:

> The environment is obviously important, but its role has remained obscure. It does not push or pull, it *selects*, and this function is difficult to discover and analyze. The role of natural selection in evolution was formulated only a little more than a hundred years ago, and the selective role of the environment in shaping and maintaining the behavior of the individual is only beginning to be recognized and studied. As the interaction between organism and environment has come to be understood, however, effects once assigned to states of mind, feeling, and traits are beginning to be traced to accessible conditions, and a technology of behavior may therefore become available. It will not solve our problems, however, until it replaces traditional prescientific views, and these views are strongly entrenched. (Skinner, 1971, p. 25)

Thus, Skinner applied Darwinian notions to his analysis of behavior. In any given situation, an organism initially makes a wide variety of responses. Of those responses, only a few will be functional (reinforcing). These effective responses survive and become part of the organism's response repertoire to be used when that situation next occurs.

According to Skinner, the fact that behavior is governed by reinforcement contingencies provides hope for the solution of a number of societal problems. If it was the "mind" or the "self" that needed to be understood instead of how the environment selects behavior, we would be in trouble:

> Fortunately, the point of attack is more readily accessible. It is the environment which must be changed. A way of life which furthers the study of human behavior in its relation to that environment should be in the best possible position to solve its major problems. This is not jingoism, because the great problems are now global. In the behavioristic view, man can now control his own destiny because he knows what must be done and how to do it. (Skinner, 1974, p. 251)

Skinner's novel *Walden Two* also made many of these points. Following Watson's "commercialization" of psychology to the public, there had been something of a backlash against the notion of a better life through the science of psychology. For example, Orwell's *1984* and Huxley's *Brave New World* both featured conditioning gone amok. As such, many of Skinner's works sought to showcase how psychology could positively serve society. In *Beyond Freedom and Dignity* (1971), Skinner reviewed the reasons that cultural engineering, although possible, has been largely rejected.

The Control of Behavior. Like Thorndike, Skinner (1971) found that the effects of reinforcement and punishment are not symmetrical; reinforcement strengthens behavior, but punishment does not weaken behavior:

> A child who has been severely punished for sex play is not necessarily less inclined to continue; and a man who has been imprisoned for violent assault is not necessarily less inclined toward violence. Punished behavior is likely to reappear after the punitive contingencies are withdrawn. (p. 62)

Why, if punishment is ineffective as a modifier of behavior, is it so widely used? Because, said Skinner (1953), it is reinforcing to the punisher:

> Severe punishment unquestionably has an immediate effect in reducing a tendency to act in a given way. This result is no doubt responsible for its widespread use. We "instinctively" attack anyone whose behavior displeases us—perhaps not in physical assault, but with criticism, disapproval, blame, or ridicule. Whether or not there is an inherited tendency to do this, the immediate effect of the practice is reinforcing enough to explain its currency. In the long run, however, punishment does not actually eliminate behavior from a repertoire, and its temporary achievement is obtained at tremendous cost in reducing the over-all efficiency and happiness of the group. (p. 190)

The "tremendous cost" involved in the use of punishment comes from the many negative by-products associated with it, including the fact that it induces fear, it often elicits aggression, it justifies inflicting pain on others, and it often replaces one undesirable response with another, such as when a child spanked for a wrongdoing cries instead. How then is undesirable behavior to be dealt with? Skinner (1953) said to ignore it:

> The most effective alternative process [to punishment] is probably *extinction*. This takes time but is much more rapid than allowing the response to be forgotten. The technique seems to be relatively free of objectionable by-products. We recommend it, for example, when we suggest that a parent "pay no attention" to objectionable behavior on the part of his child. If the child's behavior is strong only because it has been reinforced by "getting a rise out of" the parent, it will disappear when this consequence is no longer forthcoming. (p. 192)

Because of the relative ineffectiveness of punishment and the many negative by-products associated with its use, Skinner consistently urged that behavior be modified positively through reinforcement contingencies, not negatively through punishment. Students are sometimes confused then by the notion of (and term) *negative reinforcement*. Importantly, negative reinforcement is not punishment. Negative reinforcement is reinforcement by removal of an unpleasant environmental circumstance instead of providing a rewarding circumstance (as in positive reinforcement)—but in both situations the result is reinforcing.

Skinnerian Principles

Skinner's Attitude Toward Theory. Skinner accepted operationism but rejected the theoretical aspects of logical positivism. He was content to manipulate environmental events (such as reinforcement contingencies) and note the effects of these manipulations on behavior, believing that this functional analysis is all that is necessary. For this reason, Skinner's approach is sometimes referred to as a **descriptive behaviorism**. There is, Skinner felt, no reason for looking "under the skin" for explanations of relationships between the environment and behavior. Looking for physiological explanations of behavior is a waste of time because overt behavior occurs whether or not we know its neurophysiological underpinnings. We have already reviewed Skinner's attitude toward mentalistic explanations of behavior. Because Skinner did not care what was going on "under the skin" either physiologically or mentally, his approach is even referred to as the empty-organism approach. Skinner knew, of course, that the organism is not empty, but he thought that nothing is lost by ignoring events that intervene between the environment and the behavior it selects.

Besides opposing physiological and mentalistic explanations of behavior, Skinner (1950) opposed abstract theorizing:

> Research designed with respect to theory is also likely to be wasteful. That a theory generates research does not prove its value unless the research is valuable. Much useless experimentation results from theories, and much energy and skill are absorbed by them. Most theories are eventually overthrown, and the greater part of the associated research is discarded. This could be justified if it were true that productive research requires a theory—as is, of course, often claimed. It is argued that research would be aimless and disorganized without a theory to guide it. The view is supported by psychological texts which take their cue from the logicians rather than empirical science, and describe thinking as necessarily involving stages of hypothesis, deduction, experimental test, and confirmation. But this is not the way most scientists actually work. It is possible to design significant experiments for other reasons, and the possibility to be examined is that such research will lead more directly to the kind of information which a science usually accumulates. (pp. 194–195)

In describing his nontheoretical approach, Skinner (1956) said that if he tried something and if it seemed to be leading to something useful, he persisted. If what he was doing seemed to be leading to a dead end, he abandoned it and tried something else.

Applications. Like Watson, Skinner and his followers sought to apply their principles to the solution of practical problems. In all applications of Skinnerian principles, the general rule is always the same: *Change reinforcement contingencies, and you change behavior*. This principle has been used to teach pigeons to play games like table tennis and basketball, and many animals trained through the use of Skinnerian principles have performed at tourist attractions throughout the United States. In a defense effort, Skinner and colleagues (Estes, as well as Marian and Keller Breland) even trained pigeons to guide missiles toward enemy targets (Skinner, 1960).

In the realm of education, Skinner developed a teaching technique called *programmed learning* (1954, 1958). With programmed learning, material is presented to students in small steps; students are then tested on the material, given immediate feedback on the accuracy of their answers, and allowed to proceed through the material at their own pace. Skinner had criticized U.S. education ever since 1953, when he visited his daughter's classroom and concluded that the teacher was violating everything that was known about learning. Skinner (1984) maintained that many of the problems in our educational system could be solved through the use of operant principles. Skinner's main criticism of U.S. educational practices was that the threat of punishment is used to force students to learn and to behave instead of the careful manipulation of reinforcement contingencies. This aversive control, Skinner said, creates a negative attitude toward education.

In 1983 Skinner, along with Margaret Vaughan, wrote *Enjoy Old Age: Living Fully Your Later Years*, in which they addressed such topics as diet, retirement, exercise, forgetfulness, sensory

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deficiencies, and fear of death. Interestingly, although Skinner counseled the elderly to avoid fatigue, he and Vaughan wrote the book in three months.

Skinner and his followers have applied behavior modification principles to helping individuals with problems ranging from psychosis to smoking, alcoholism, drug addiction, mental retardation, juvenile delinquency, speech disorders, shyness, phobias, obesity, and sexual dysfunction. The Skinnerian version of **behavior therapy** assumes that people learn abnormal behavior in the same way that they learn normal behavior. Therefore, "treatment" is a matter of removing the reinforcers that are maintaining the undesirable behavior and arranging the reinforcement contingencies so that they strengthen desirable behavior.

Skinnerian principles have also been used to create **token economies** in a number of institutions, such as psychiatric hospitals. When participants in such economies behave in desirable ways, they are reinforced with tokens that can be exchanged for such items as candy, cigarettes, coffee, or the exclusive use of a radio or television set. Token economies have been criticized as contrived or unnatural but, according to Masters, Burish, Hollon, and Rimm (1987), it is institutions without token economies that are unnatural and relatively ineffective:

> Token economies are not really unnatural. Indeed, any national economy with a currency system is in every sense a token economy: any currency consists by definition of token or symbolic "reinforcers" that may be exchanged for items that constitute a more direct form of reinforcement. Whereas the individual in society works to earn tokens (money) with which he purchases his dwelling place, food, recreation, and so on, most institutions provide such comforts noncontingently and hence cease to encourage many adaptive behaviors that are appropriate and effective in the natural environment. (p. 222)

In general, the use of Skinnerian principles in treating behavior problems has been very effective (for example, see Ayllon & Azrin, 1968; Craighead, Kazdin, & Mahoney, 1976; Kazdin, 1989; Kazdin & Wilson, 1978; Leitenberg, 1976; Masters et al., 1987; Rimm & Masters, 1974; Ulrich, Stachnik, & Mabry, 1966). For his role in developing behavior modification procedures used to improve the quality of life of the mentally retarded, Skinner was presented a Kennedy International Award in 1971. In 1972 he was named "Humanist of the Year" by the American Humanist Association. On August 10, 1990, the APA presented Skinner with an unprecedented Lifetime Contribution to Psychology Award. Eight days later, he died of leukemia at the age of 86. As a further tribute to Skinner, the entire November 1992 issue of the *American Psychologist* was dedicated to his ideas and their influence.

EDWARD CHACE TOLMAN

Edward Chace Tolman (1886–1959) was born in West Newton, Massachusetts, the son of a businessman who was a member of the first graduating class of the Massachusetts Institute of Technology (MIT) and later a member of its board of trustees. Tolman's father, encouraged by his wife who was raised in the Quaker religion, had a strong interest in social reform. Both sons, Edward and his older brother Richard, earned their undergraduate degrees in chemistry at MIT. Richard went on to become a prominent physicist after earning his doctorate at MIT. Edward's interests began to turn toward philosophy and psychology after taking summer school courses from Harvard philosopher Ralph Barton Perry (1876–1957) and Harvard psychologist Robert Yerkes; most influential, however, was his reading of James's *Principles*. At this time, U.S. psychology was dominated by Titchener and James, and psychology was still defined as the study of conscious experience, a fact that bothered Tolman (1922):

> The definition of psychology as the examination and analysis of private conscious contents has been something of a logical sticker. For how *can* one build up a

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Edward Chace Tolman

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> science upon elements which, by very definition, are said to be private and non-communicable? (p. 44)

Tolman's concern was put to rest in the course he took from Yerkes, in which J. B. Watson's *Behavior: An Introduction to Comparative Psychology* (1914) was used as the text:

> This worry about introspection is perhaps one reason why my introduction in Yerkes' courses to Watson behaviorism came as a tremendous stimulus and relief. If objective measurement of behavior and not introspection was the true method of psychology I didn't have to worry any longer. (Tolman, 1952, p. 326)

In 1911 Tolman decided to pursue graduate work in philosophy and psychology at Harvard; once enrolled, his interest turned increasingly to psychology. After a year of study, Tolman decided to improve his German by spending a summer in Germany. While in Germany, Tolman studied with the young Gestalt psychologist Kurt Koffka (whom we will meet in the next chapter), and Gestalt psychology greatly influenced his later theorizing. Upon returning to Harvard, Tolman studied the learning of nonsense material under the supervision of Hugo Münsterberg, and his doctoral dissertation was on retroactive inhibition (Tolman, 1917).

After attaining his doctorate from Harvard in 1915, Tolman accepted an appointment at Northwestern University. Although he became a compulsive researcher, he confessed to being "self-conscious and inarticulate" as a teacher and frightened of his classes. Also, at about the time that the United States entered World War I, he wrote an essay expressing his pacifism. In 1918 Tolman was dismissed for "lack of teaching success," but more than likely his pacifism contributed to his dismissal. From Northwestern he went to the University of California at Berkeley, where he remained almost without interruption for the rest of his career. As we have seen, Tolman was raised in a Quaker home, and pacifism was a constant theme throughout his life. He wrote a short book titled *Drives Toward War* (1942) to explain, from a psychoanalytic viewpoint, the human motives responsible for warfare. In the preface of that book, he stated his reasons for writing it:

> As an American, a college professor, and one brought up in the pacifist tradition, I am intensely biased against war. It is for me stupid, interrupting, unnecessary, and unimaginably horrible. I write this essay within that frame of reference. In short, I am driven to discuss the psychology of war and its possible abolition because I want intensely to get rid of it. (p. xi)

By the time the book came out, however, the United States was already involved in World War II. The brutality of the war overcame even Tolman's strong pacifism, and after receiving the approval of his brother Richard, he served for two years in the Office of Strategic Services (1944–1945).

After the war, Tolman's social conscience was tested once again. In the early 1950s, under the influence of McCarthyism, the University of California began to require its faculty members to sign a loyalty oath, and Tolman led a group of faculty members who would rather resign than sign

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it. They saw the requirement as an infringement of their civil liberties and academic freedom. Tolman was suspended from his duties at California and taught for a while at the University of Chicago and Harvard. Finally, the courts agreed with Tolman, and he was reinstated at the University of California. In 1959, upon his retirement and shortly before his death, the regents of the university symbolically admitted that Tolman's position had been morally correct by awarding him an honorary doctorate.

Tolman was a kind, shy, honest person who inspired affection and admiration from his students and colleagues. Although he was always willing to engage in intellectual dispute, he never took himself or his work too seriously. In the final year of his life, Tolman (1959) reflected on his theoretical contributions:

> [My theory] may well not stand up to any final canons of scientific procedure. But I do not much care. I have liked to think about psychology in ways that have proved congenial to me. Since all the sciences, and especially psychology, are still immersed in such tremendous realms of the uncertain and the unknown, the best that any individual scientist, especially any psychologist, can do seems to be to follow his own gleam and his own bent, however inadequate they may be. In fact, I suppose that actually this is what we all do. In the end, the only sure criterion is to have fun. And I have had fun. (p. 159)

Tolman died in Berkeley, California, on November 19, 1959.

Purposive Behaviorism

In the early 1920s, there were two dominant explanations of learning: Watson's explanation in terms of such associative principles as contiguity and frequency, and Thorndike's, which emphasized the law of effect. Tolman (1952) explained why he could accept neither:

> It was Watson's denial of the law of effect and his emphasis on frequency and recency as the prime determiners of animal learning which first attracted our attention. In this we were on Watson's side. But we got ourselves—or at least I got myself—into a sort of in-between position. On the one hand I sided with Watson in not liking the law of effect. But, on the other hand, I also did not like Watson's over-simplified notions of stimulus and response.… (p. 329)

Tolman (perhaps incorrectly) referred to Watson's psychology as "twitchism" because he felt it concentrated on isolated responses to specific stimuli. Watson contended that even the most complex human behavior could be explained in terms of S–R reflexes. Tolman referred to such reflexes as **molecular behavior**. Instead of taking as his subject matter these "twitches," Tolman decided to study **purposive behavior**. Although Tolman's approach differed from Watson's in several important ways, Tolman was still a behaviorist and was completely opposed to introspection. In other words, Tolman agreed with Watson that behavior should be psychology's subject matter, but Tolman believed that Watson was focusing on the wrong type of behavior. The question was how Tolman could employ a mentalistic term like *purpose* and still remain a behaviorist.

While at Harvard, Tolman learned from two of his professors, Edwin B. Holt and Ralph Barton Perry, that the purposive aspects of behavior could be studied without sacrificing scientific objectivity. This was done by seeing purpose *in* the behavior itself and not inferring purpose *from* the behavior. Tolman accepted this contention and believed that it pointed to a major distinction between his view of purpose and that of McDougall: "The fundamental difference between [McDougall] and us arises in that he, being a 'mentalist,' merely *infers* purpose from these aspects of behavior; whereas we, being behaviorists, *identify* purpose with such aspects" (1925, p. 288). Tolman would later change his position and use the terms *purpose* and *cognition* more in accordance with the mentalistic tradition as actual determinants of behavior. Tolman never believed, however, that using concepts like purpose and cognition violated the tenets of behaviorism.

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For a discussion of Tolman's use of mentalistic terms and how that use changed during his career, see L. D. Smith (1982).

Tolman called purposive behavior **molar behavior** to contrast it with molecular behavior. Because Tolman chose to study molar behavior, his position is often referred to as **purposive behaviorism**. In his major work, *Purposive Behavior in Animals and Men* (1932), Tolman gave examples of what he called purposive (molar) behavior:

> A rat running a maze; a cat getting out of a puzzle box; a man driving home to dinner; a child hiding from a stranger; a woman doing her washing or gossiping over the telephone; a pupil marking a mental-test sheet; a psychologist reciting a list of nonsense syllables; my friend and I telling one another our thoughts and feelings—*these are behaviors (Qua Molar)*. And it must be noted that in mentioning no one of them have we referred to, or, we blush to confess it, for the most part even known, what were the exact muscles and glands, sensory nerves, and motor nerves involved.
> For these responses somehow had other sufficiently identifying properties of their own. (p. 8)

Tolman's Rats. Tolman did not engage in any animal research as a graduate student at Harvard or as an instructor at Northwestern University. When he arrived at the University of California, he was asked to suggest a new course to teach and, remembering his time with Yerkes, chose to teach comparative psychology. It was teaching this course that stimulated Tolman's interest in the rat as an experimental subject. He saw the use of rats as a way of guarding against even the possibility of indirect introspection that could occur if humans were used as experimental subjects. Tolman developed such a fondness for rats that he dedicated his *Purposive Behavior* to the white rat, and in 1945 he said,

> Let it be noted that rats live in cages; they do not go on binges the night before one has planned an experiment; they do not kill each other off in wars; they do not invent engines of destruction, and if they did, they would not be so inept about controlling such engines; they do not go in for either class conflicts or race conflicts; they avoid politics, economics, and papers on psychology. They are marvelous, pure, and delightful. (p. 166)

About what could be learned by studying rats, Tolman (1938) said,

> I believe that everything important in psychology (except perhaps such matters as the building up of a super-ego, that is, everything save such matters as involve society and words) can be investigated in essence through the continued experimental and theoretical analysis of the determiners of rat behavior at a choice-point in a maze. Herein I believe I agree with Professor Hull and also with Professor Thorndike. (p. 34)

The Use of Intervening Variables

Tolman was not consistent in using mentalistic concepts as only *descriptions* of behavior. By 1925 he was referring to purpose and cognition both as descriptions and *determinants* of behavior. In the following quotation, Tolman (1928) appeared to believe that purposes were in the organism and were causally related to its behavior:

> Our doctrine … is that behavior (except in the case of the simplest reflexes) is not governed by simple one to one stimulus-response connections. It is governed by more or less complicated sets of patterns of adjustment which get set up within the organism. And in so far as these sets of adjustments cause only those acts to persist and to get learned which end in getting the organism to (or from) specific ends, these sets or adjustments constitute purposes. (p. 526)

Increasingly, Tolman came to believe that cognitive processes really exist and are influential in determining behavior (as McDougall believed). In 1938 he decided how he would proceed: "I, in my future work, intend to go ahead imagining how, *if I were a rat*, I would behave" (p. 24). Clearly, Tolman was now embracing mentalism, and yet he still felt strongly about remaining a behaviorist. For Tolman, the solution to the dilemma was to treat cognitive events as **intervening variables**—that is, variables that intervene between environmental events and behavior. Following logical positivism, Tolman painstakingly tied all his intervening variables to observable behavior. In other words, he operationally defined all his theoretical terms. Tolman's final position was to regard purpose and cognition as theoretical constructs that could be used to describe, predict, and explain behavior.

By introducing the use of intervening variables, Tolman brought abstract scientific theory into psychology. It was clear that environmental events influenced behavior; the problem was to understand *why* they did. One could remain entirely descriptive and simply note what organisms do in certain situations, but for Tolman this was unsatisfactory. Here is a simplified diagram of Tolman's approach:

Independent Variables
(*Environmental Events*)
↓
Intervening Variables
(*Theoretical Concepts*)
↓
Dependent Variables
(*Behavior*)

Thus, for Tolman, environmental experience gives rise to internal, unobservable events, which, in turn, cause behavior. To account fully for the behavior, one has to know both the environmental events *and* the internal (or intervening) events that they initiate. The most important intervening variables Tolman postulated are cognitive. Tolman, then, was a methodological rather than a radical behaviorist. What made Tolman a different type of mentalist was his insistence that his intervening variables, even those that were presumed to be mental, be operationally defined—that is, systematically tied to observable events.

Hypotheses, Expectancies, Beliefs, and Cognitive Maps. Although Tolman used several intervening variables, we will discuss only those related to the development of a cognitive map. Everyone knows that a rat learns to solve a maze; the question is, How does it do so? Tolman's explanation was mentalistic. As an example, when an animal is first placed in the start box of a T-maze, the experience is entirely new, and therefore the animal can use no information from prior experience. As the animal runs the maze, it sometimes turns right at the choice point and sometimes left. Let us say that the experimenter has arranged the situation so that turning left is reinforced with food. At some point, the animal formulates a **hypothesis** that turning one way leads to food and turning another way does not. In the early stages of hypothesis formation, the animal may pause at the choice point as if to "ponder" the alternatives. Tolman referred to this apparent pondering as **vicarious trial and error** because, instead of behaving overtly in a trial-and-error fashion, the animal appears to be engaged in mental trial and error. If the early hypothesis "If I turn left, I will find food" is confirmed, the animal will develop the **expectancy** "When I turn left, I will find food." If the expectancy is consistently confirmed, the animal will develop the **belief** "Every time I turn left in this situation, I will find food." Through this process, a **cognitive map** of this situation develops—an awareness of all possibilities in a situation—for example: If I leave the start box, I will find the choice point; if I turn left at the choice point, I will find food; if I turn right, I will not; and so on.

For Tolman, hypotheses, expectations, beliefs, and finally a cognitive map intervene between experience and behavior. Rather than just describing an organism's behavior, these intervening variables were thought to explain it. Tolman was careful, however, to test his theoretical assumptions through experimentation. Tolman's research program was one of the most creative any psychologist

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has ever devised (for details, see Hergenhahn & Olson, 2005).

Tolman on Reinforcement

Tolman did not believe that learning is an automatic process based on contiguity and frequency nor that it results from reinforcement (a pleasurable state of affairs). He believed that learning occurs constantly, with or without reinforcement and with or without motivation. About as close as Tolman came to a concept of reinforcement was confirmation. Through the **confirmation** of a hypothesis, expectancy, or belief, a cognitive map develops or is maintained. The animal learns what leads to what in the environment—that if it does such and such, such and such will follow; or that if it sees one stimulus (S_1), a second stimulus (S_2) will follow. Because Tolman emphasized the learning of relationships among stimuli, his position is sometimes called an S–S theory rather than an S–R theory.

According to Tolman's theory, an organism learns constantly as it observes its environment. But whether the organism uses what it learned—and if so, how—is determined by the organism's motivational state. For example, a food-satiated rat might not leave the start box of a maze or might wander casually through the maze even though it had previously learned what had to be done to obtain food. Thus, for Tolman, motivation influences performance but not learning. Tolman defined **performance** as the translation of learning into behavior. The importance of motivation in Tolman's theory was due to the influence of Woodworth's dynamic psychology.

Latent Learning. In one of his famous **latent learning** experiments, Tolman dramatically demonstrated the distinction between learning and performance. Tolman and Honzik (1930) ran an experiment using three groups of rats as subjects. Subjects in group 1 were reinforced with food each time they correctly traversed a maze. Subjects in group 2 wandered through the maze but were not reinforced if they reached the goal box. Subjects in group 3 were treated like subjects in group 2 until the 11th day, when they began receiving reinforcement in the goal box. Subjects in all three groups were deprived of food before being placed in the maze. Tolman's hypothesis was that subjects in all groups were learning the maze (making cognitive maps) as they wandered through it. If his hypothesis was correct, subjects in group 3 should perform as well as subjects in group 1 from the 12th day on. This was because, before the 11th day, subjects in group 3 had already learned and mapped out how to arrive at the goal box, and finding food there on the 11th day had given them an incentive for acting on this information. As Figure 13.1 shows, the experiment supported Tolman's hypothesis. Learning appeared to remain latent until the organism had a reason to use it.

Although much of this work was done before Hull and Skinner had reached their zenith, we place Tolman after them because his findings contrast so sharply with the positions of such reinforcement theorists. Skinner's system, which remains popular today, and Hull's system, which has enjoyed some resurgence as a model for developing intelligent machines, are both systems in which learning is tied to doing. That learning is frequently the consequence of behavior is not in dispute, but Tolman's more cognitively oriented results showed the complexity of learning as well as the viability of other explanations.

Tolman's Influence

L. D. Smith (1982) summarizes Tolman's importance as follows:

> In adopting and adapting the concepts of purpose and cognition … Tolman helped preserve and shape the tradition of cognitive psychology during a time when it was nearly eclipsed by the ascendancy of classical behaviorism. He was able to do so by demonstrating that such concepts were compatible with a behaviorism of a more sophisticated … variety. (p. 160)

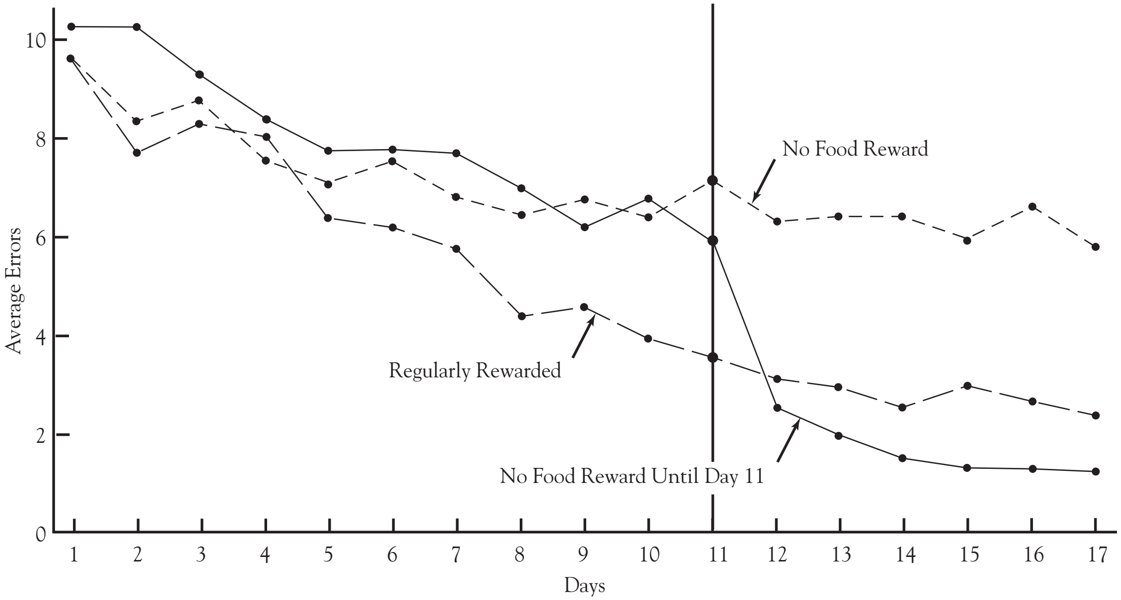

FIGURE 13.1

The results of the Tolman and Honzik (1930) experiment on latent learning. (Used by permission.)

With regard to Tolman's use of mentalistic concepts, Innis (1999) says:

> Rather than get rid of them, he wanted to give them objective, operational definitions. In place of the sterile mathematics and empty organisms of his competitors, Tolman proposed a rich theoretical structure in which purpose and cognition played well-defined parts as potentially measurable intervening variables. For him, actions were infused with meaning; behavior was goal-directed—that is, motivated and purposive. However, adopting this view did not mean that it was impossible to develop mechanistic rules to account for the behavior observed. (p. 115)

Like Hull, once Tolman began postulating intervening variables, his theory became extremely complex. He postulated several independent variables and several intervening variables, and the possible interactions between the two types of variables were enormous. Tolman expressed regret over this practical difficulty. As L. D. Smith (1982) notes, modern computing has offered some hope for managing this complexity and has invited a reconsideration of such theories.

Clearly, Tolman viewed organisms as active processors of information, and such a view is very much in accordance with contemporary cognitive psychology. In Chapter 19, we will see much in common between Tolman's theory and both information-processing psychology and Bandura's social cognitive theory. Also (although space does not permit discussion of it), Tolman was a pioneer in the currently popular field of behavior genetics (Innis, 1992). Tolman was the first to publish a study on selective breeding for maze-learning ability in rats (1924). And it was Tolman's student, Robert C. Tryon, whose name became most associated with selective breeding because of his longitudinal study of maze-bright and maze-dull rats.

In 1937 Tolman served as the 45th president of the American Psychological Association (APA), and

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in 1957 he received the APA's Distinguished Scientific Contribution Award with the following citation:

> For the creative and sustained pursuit of a theoretical integration of the multifaceted data of psychology, not just its more circumscribed and amenable aspects; for forcing theorizing out of the mechanical and peripheral into the center of psychology without the loss of objectivity and discipline; for returning [the human being] to psychology by insisting upon molar behavior purposely organized as the unit of analysis, most explicitly illustrated in his purposive-cognitive theory of learning. (*American Psychologist*, 1958, p. 155)

BEHAVIORISM TODAY

For several decades behaviorism formed the mainstream of American psychology. In addition to the major figures we have considered, there were many other behaviorists we have mentioned only in passing (for example, Kantor, Holt, Barker) or cover elsewhere (Gibson, Chapter 6; Bandura, Chapter 19). Even now, the work of all the neobehaviorists covered in this chapter remains influential to one degree or another. Tolman's brand of behaviorism, with its emphasis on purposive behavior and mental constructs, can even be viewed as a forerunner to current cognitive psychology.

Skinner's influence remains especially strong. In 1974 Skinner wrote *About Behaviorism*, which attempted to correct 20 misconceptions about behaviorism. In this book, Skinner traced a number of these misconceptions to Watson's early writings—for example, Watson's dependence on reflexive behavior and his denial of the importance of genetic endowment. Skinner's position rectified both "mistakes." Skinner also pointed out that he did not deny so-called mental processes but believed that ultimately they will be explained as verbal labels that we attach to certain bodily processes. As evidence of the enduring popularity of Skinnerian behaviorism, followers of Skinner have formed their own division of the APA (Division 25, the division of the Experimental Analysis of Behavior) and have their own journals in which to publish their research.

Korn, Davis, and Davis (1991) asked historians of psychology and chairpersons of graduate programs in psychology to rank the 10 most important psychologists of all time and the 10 most important contemporary psychologists. On the "all time" list, historians ranked Wundt first and Skinner eighth. Chairpersons ranked Skinner first and Wundt sixth. On the "contemporary" list, both historians and chairpersons ranked Skinner first. In another survey 1,725 members of the American Psychological Society were asked to rank the most eminent psychologists of the 20th century. In this survey, Skinner ranked first, Piaget second, and Freud third (Dittman, 2002). As far as recognition by the general public is concerned, Skinner is perhaps second only to Freud. For an interesting account of how the popular press reacted to Skinner's ideas, see Rutherford (2000).

Despite the many manifestations of behaviorism and neobehaviorism in contemporary psychology, the influence of both has diminished. The overwhelming interest in cognitive psychology today runs counter to most brands of behaviorism except Tolman's (see Chapter 19). Contrary to what the behaviorists believed, evolutionary psychologists, and others, are providing evidence that much animal behavior, including human social behavior, is genetically influenced (see Chapter 18). Also, the neobehaviorist's insistence that all theoretical terms be operationally defined became a problem. Even the logical positivists abandoned a strict operationism because it was too restrictive; it excluded from science concepts that were too nebulous to be defined operationally but were still useful in suggesting new avenues of research and methods of inquiry:

> If one were to criticize behaviorism, it would not be for what it tried to accomplish, but rather for the things it found necessary to *deny*. Fundamentally, it denied the need for

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> free theorizing, because all theory had to be limited to observable stimuli and responses. It denied all of the commonsense constructs without which none of us can get along in the world: Conscious experience, thinking, knowledge, images, feelings, and so on. In fact, it rejected commonsense knowledge by fiat, rather than testing it and transcending it, as the other sciences had done. (Baars, 1986, pp. 82–83)

Even the suggestions that logical positivism made concerning theory construction eventually fell into disrepute. Perhaps the most important reason that logical positivism ultimately failed was the discovery that it did not accurately describe how science was conducted even by its most effective practitioners. Individuals such as Thomas Kuhn (see Chapter 1) have shown that the behavior of scientists is determined as much by social pressure, preexisting beliefs, personal biases, and base emotions as by axioms, postulates, theories, or logic.

One major legacy of behaviorism and neobehaviorism still characterizes psychology, however. Psychologists generally agree now that the subject matter of psychology is overt behavior. Today, cognitive psychology is king, but even the psychologists studying cognitions use behavior to index those events. In that sense, most experimental psychologists today are behaviorists.

SUMMARY

The positivism of Bacon, Comte, and Mach insisted that only that which is directly observable be the object of scientific investigation. For the positivists, all speculation about abstract entities should be actively avoided. Watson and the Russian physiologists were positivists. The logical positivists had a more liberal view of scientific activity. For them, theorizing about unobservable entities was allowed, provided those entities were directly linked to observable events via operational definitions. Operational definitions define abstract concepts in terms of the procedures used to measure those concepts. The belief that all scientific concepts be operationally defined was called operationism. Physicalism was the belief that all sciences should share common assumptions, principles, and methodologies and should model themselves after physics. Neobehaviorism resulted when behaviorism, with its insistence that the subject matter of psychology be overt behavior, merged with logical positivism, with its acceptance of theory and its insistence on operational definitions. By following the tenets of logical positivism, many neobehaviorists believed they could be theoretical and still remain objective.

Guthrie created an extremely parsimonious theory of learning. All learning was explained by the law of contiguity, which stated that when a pattern of stimuli and a response occur together they become associated. Furthermore, the association between the two occurs at full strength after just one exposure. By postulating one-trial learning, Guthrie rejected the law of frequency. To explain why practice improves performance, Guthrie differentiated among movements, acts, and skills. A movement is a specific response made to a specific pattern of stimuli. It is the association between a movement and a pattern of stimuli that is learned in one trial. An act is a movement that has become associated with a number of stimuli patterns. A skill, in turn, consists of many acts. It is because acts are made up of many movements and skills are made up of many acts that practice improves performance. According to Guthrie, bad habits can be broken by causing a response, other than the undesirable one, to be made in the presence of the stimuli that previously elicited the undesirable response. Attempts to formalize Guthrie's theory, thereby making it more testable, were made by Virginia Voeks and William Estes.

Using intervening variables Hull developed an open-ended, self-correcting, hypothetico-deductive theory of learning. If experimentation supports the deductions from this theory, the theory gains strength; if not, the part of the theory on which the deductions were based is revised. Equating reinforcement with drive reduction, Hull defined habit strength as the number of reinforced pairings between a stimulus and a response. He saw reaction potential as a function of the amount of habit strength and drive present. Hull's theory was extremely influential in the 1940s and 1950s, and because of the efforts of Hull's disciples such as Kenneth Spence, the influence of his theory extended well into the 1960s. Some particular aspects of Hull's theory are still found in contemporary psychology, but not his comprehensive approach to theory building; psychologists now seek theories of more limited domain.

In his approach to psychology, Skinner accepted positivism instead of logical positivism. He can still be classified as a neobehaviorist, however, because although he avoided theory he did accept operationism. Skinner distinguished between respondent behavior, which a known stimulus elicits, and operant behavior, which an organism emits. Skinner was concerned almost exclusively with operant behavior. For Skinner, reinforcement is anything that changes the rate or probability of a response. Nothing more needs to be known about reinforcement, nor is an understanding of physiology necessary for an understanding of behavior. Skinner urged a study of the functional relationship between behavior and the environment. Because such an analysis is correlational, it avoided the complexities of determining causation in human behavior and eliminated the need to postulate unobserved cognitive or physiological determinants of behavior. Watson and Skinner were radical behaviorists because they stressed environmental influences on behavior to the exclusion of so-called mental events and physiological states. Tolman, Hull, and Guthrie were methodological behaviorists because they were willing to theorize about internal causes of behavior (such as cognitive maps and physiological drives). Many contemporary psychologists label themselves Skinnerians and are active in both research and the applied aspects of psychology. According to Skinnerian psychology, behavior that is reinforced is strengthened (more probable), but behavior that is punished is not necessarily weakened. It is best then to arrange reinforcement contingencies so that desirable behavior is reinforced and undesirable behavior is not. No matter what type of behavior is under consideration, the rule is always the same: Change reinforcement contingencies and you change behavior.

Instead of studying reflexive, or molecular, behavior, Tolman studied purposive, or molar, behavior; thus, his version of psychology was called purposive behaviorism. According to Tolman, the learning process progresses from the formation of hypotheses concerning what leads to what in an environment, to an expectancy, and, finally, to a belief. In Tolman's theory, confirmation replaced the notion of reinforcement, and an important distinction was made between learning and performance. Aspects of contemporary cognitive psychology also have much in common with Tolman's work.

Although the influence of behaviorism and neobehaviorism has diminished in contemporary psychology, some of their basic tenets have been incorporated into all current brands of experimental psychology.

DISCUSSION QUESTIONS

1. Compare positivism to logical positivism.
2. What is an operational definition? Give an example. What is operationism?
3. What is physicalism?
4. What is neobehaviorism?
5. What was Guthrie's one law of learning?
6. Did Guthrie accept or reject the law of frequency? Explain.
7. If learning occurs at full strength in one trial, how did Guthrie explain improvement in performance as a function of practice?
8. According to Guthrie, what is the function of "reinforcement"? What did Guthrie and

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Horton observe that confirmed their view of "reinforcement"?

9. In Guthrie's theory, what is the function of maintaining stimuli? For example, how were these stimuli used to explain what other theorists called drives and intentions?
10. With reference to Hull's theory, define the following terms: *reinforcement*, *habit strength*, and *reaction potential*.
11. Why was Hull's theory called a hypothetico-deductive theory?
12. Was Skinner's proposed functional analysis of the relationship between environmental and behavioral events more in accordance with positivistic or with logical positivistic philosophy?
13. Summarize Skinner's arguments against cognitive psychology.
14. How did Skinner distinguish between respondent and operant behavior?
15. What is meant by the statement that operant behavior is controlled by its consequences?
16. Distinguish between radical and methodological behaviorism.
17. For Skinner, what constitutes a reinforcer?
18. Why did Skinner argue that behavior should be controlled by reinforcement contingencies rather than by punishment?
19. Summarize Skinner's argument against the use of theory in psychology.
20. State the general rule that Skinnerians follow in modifying behavior. Give an example of how this rule could be applied in treating a behavior disorder.
21. What convinced Tolman that he could study purposive behavior and still be an objective behaviorist?
22. Explain how Tolman used intervening variables in a way that was consistent with logical positivism.
23. What did Tolman mean by vicarious trial and error?
24. In Tolman's theory, was reinforcement necessary for learning to occur?
25. What evidence did Tolman provide for his contention that reinforcement influences performance but not learning?
26. What influence did Tolman's theory have on contemporary psychology?
27. Explain why the influence of behaviorism and neobehaviorism has diminished in contemporary psychology.
28. In what ways do the tenets of behaviorism remain influential in contemporary psychology?

SUGGESTIONS FOR FURTHER READING

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GLOSSARY

Behavior therapy The use of learning principles to treat emotional or behavioral disorders.

Belief According to Tolman, an expectation that experience has consistently confirmed.

Cognitive map According to Tolman, the mental representation of the environment.

Confirmation According to Tolman, the verification of a hypothesis, expectancy, or belief.

Descriptive behaviorism Behaviorism that is positivistic in that it describes relationships between environmental events and behavior rather than attempting to explain those relationships. Skinner's approach to psychology exemplified descriptive behaviorism.

Drive reduction Hull's proposed mechanism of reinforcement. For Hull, anything that reduces a drive is reinforcing.

Expectancy According to Tolman, a hypothesis that has been tentatively confirmed.

Functional analysis Skinner's approach to research that involves studying the systematic relationship between behavioral and environmental events. Such study focuses on the relationship between reinforcement contingencies and response rate or response probability.

Guthrie, Edwin Ray (1886–1959) Accepted the law of contiguity but not the law of frequency. For him, learning occurs at full strength after just one association between a pattern of stimuli and a response. (*See also* **Law of contiguity**.)

Habit strength ($_SH_R$) For Hull, the strength of an association between a stimulus and response. This strength depends on the number of reinforced pairings between the two.

Hull, Clark Leonard (1884–1952) Formulated a complex hypothetico-deductive theory in an attempt to explain all learning phenomena.

Hypothesis According to Tolman, an expectancy that occurs during the early stages of learning.

Hypothetico-deductive theory A set of postulates from which empirical relationships are deduced (predicted). If the empirical relationships are as predicted, the theory gains strength; if not, the theory loses strength and must be revised or abandoned.

Instrumental conditioning The type of conditioning studied by Thorndike, wherein an organism learns to make a response that is instrumental in producing reinforcement.

Intervening variables Events believed to occur between environmental and behavioral events. Although intervening variables cannot be observed directly, they are thought to be causally related to behavior. Hull's habit strength and Tolman's cognitive map are examples of intervening variables.

Latent learning According to Tolman, learning that has occurred but is not translated into behavior.

Law of contiguity Guthrie's one law of learning, which states that when a pattern of stimuli is experienced along with a response, the two become associated. In 1959 Guthrie revised the law of contiguity to read, "What is being noticed becomes a signal for what is being done."

Logical positivism The philosophy of science according to which theoretical concepts are admissible if they are tied to the observable world through operational definitions.

Maintaining stimuli According to Guthrie, the internal or external stimuli that keep an organism active until a goal is reached.

Molar behavior (*See* **Purposive behavior**.)

Molecular behavior A small segment of behavior such as a reflex or a habit that is isolated for study.

Neobehaviorism Agreed with older forms of behaviorism that overt behavior should be psychology's subject matter but disagreed that theoretical speculation concerning abstract entities must be avoided. Such speculation was accepted provided that the theoretical terms employed are operationally defined and lead to testable predictions about overt behavior.

Observational terms According to logical positivism, terms that refer to empirical events.

One-trial learning Guthrie's contention that the association between a pattern of stimuli and a response develops at full strength after just one pairing of the two.

Operant behavior Behavior that is emitted by an organism rather than elicited by a known stimulus.

Operational definition A definition that relates an abstract concept to the procedures used to measure it.

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Operationism The belief that all abstract scientific concepts should be operationally defined.

Performance The translation of learning into behavior.

Physicalism A belief growing out of logical positivism that all sciences should share common assumptions, principles, and methodologies and should model themselves after physics.

Positivism The belief that science should study only those objects or events that can be experienced directly. That is, all speculation about abstract entities should be avoided.

Purposive behavior Behavior that is directed toward some goal and that terminates when the goal is attained.

Purposive behaviorism The type of behaviorism Tolman pursued, which emphasizes molar rather than molecular behavior.

Reaction potential ($_SE_R$) For Hull, the probability of a learned response being elicited in a given situation. This probability is a function of the amount of drive and habit strength present.

Reinforcement For Hull, drive reduction; for Skinner, anything that increases the rate or the probability of a response; for Tolman, the confirmation of a hypothesis, expectation, or belief; for Guthrie, a mechanical arrangement that prevents unlearning.

Respondent behavior Behavior that is elicited by a known stimulus.

Skinner, Burrhus Frederic (1904–1990) A behaviorist who believed that psychology should study the functional relationship between environmental events, such as reinforcement contingencies, and behavior. Skinner's work exemplified positivism. (*See also* **Positivism.**)

S–R psychology The type of psychology insisting that environmental stimuli elicit most, if not all, behavior. The Russian physiologists and Watson were S–R psychologists.

Theoretical terms According to logical positivism, those terms that are employed to explain empirical observations.

Token economies An arrangement within institutions whereby desirable behavior is strengthened using valuable tokens as reinforcers.

Tolman, Edward Chace (1886–1959) Created a brand of behaviorism that used mental constructs and emphasized purposive behavior. Although Tolman employed many intervening variables, his most important was the cognitive map.

Vicarious trial and error According to Tolman, the apparent pondering of behavioral choices in a learning situation.

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14

Gestalt Psychology

About the same time that the behaviorists rebelled against structuralism and functionalism in the United States, a group of young German psychologists were changing German psychology. Whereas the focus of the behaviorists' attack was against the study of consciousness, these Germans assaulted Wundt's **elementism**. Just as the behaviorists arose from the functionalists, this new German psychology built upon the insights of Brentano's act psychology and the Würzburg school that said consciousness could not be reduced to elements without distorting the true meaning of the experience. For them, the type of conscious experience Wundt and the structuralists investigated was artificial. These young psychologists believed that we do not experience things in isolated pieces, but in meaningful, intact configurations. We do not see patches of green, blue, and red; we see people, cars, trees, and clouds. These meaningful, intact, conscious experiences are what psychology should concentrate on. Because the German word for "configuration," or "form," is *Gestalt*, this new type of psychology was called **Gestalt** psychology.

The Gestaltists were opposed to any type of elementism in psychology, whether it be the type Wundt and the structuralists practiced or the type the behaviorists practiced in their search for S–R associations. The attempt to reduce either consciousness or behavior to the basic elements is called the **molecular approach** to psychology, and psychologists such as Wundt, Titchener, Pavlov, and Watson used this type of approach. The Gestaltists argued that a molar approach should be taken. Taking the **molar approach** in studying consciousness would mean concentrating on *phenomenological* experience (mental experience as it occurred to the naive observer, without further analysis). The term *phenomenon* means "that which appears" or "that which is given," and so **phenomenology**, is the study of that which naturally appears in consciousness. Taking the molar, or phenomenological, approach while studying behavior means concentrating on goal-directed (purposive) behavior. We saw in the last chapter that, under the influence of Gestalt psychology, Tolman chose to study this type of behavior. As we will see, the Gestaltists attempted to show that in every aspect of psychology, it is more beneficial to concentrate on wholes (*Gestalten*, plural of *Gestalt*) than on parts (atoms, elements). Those taking a molar approach to the study of behavior or psychological phenomena are called **holists**, in contrast to the elementists or atomists, who study complex phenomena by seeking simpler components that compose those phenomena. The Gestaltists were holists.

ANTECEDENTS OF GESTALT PSYCHOLOGY

We have mentioned Brentano and the Würzburgers as forerunners to Gestalt psychology, but the roots run deeper.

Immanuel Kant. Immanuel Kant, the prototypical rationalist, believed that conscious experience is the result of the interaction between sensory stimulation and the actions of the faculties of the mind. In other words, the mind adds structure to our conscious experience that sensory stimulation does not provide. If the phrase *faculties of the mind* is replaced by *characteristics of the brain*, there is considerable agreement between Kant and the Gestaltists. Both believed that conscious experience cannot be reduced to sensory stimulation, and for both conscious experience is different from the elements that compose it. Therefore, looking for a one-to-one correspondence between sensory events and conscious experience is doomed to failure. For Kant and the Gestaltists, an important difference exists between perception and sensation. This difference arises because our minds (Kant) or our brains (the Gestaltists) filter sensory experience, making it more structured and organized and thus more meaningful—a collection of raw sensations—shape, hues, texture, becomes the familiar perception of this textbook.

Ernst Mach. Ernst Mach, a physicist, postulated (1886/1914) two perceptions that appeared to be independent of the particular elements that compose them: *space form* and *time form*. For example, one experiences the form of a circle whether the actual circle presented is large, small, red, blue, bright, or dull. The experience of "circleness" is therefore an example of space form. Similarly, a melody is recognizable as the same no matter what key or tempo it is played in. Thus, a melody is an example of time form. Mach was making the important point that a wide variety of sensory elements can give rise to the same perception; therefore, at least some perceptions are independent of any particular cluster of sensory elements, an idea that would be developed at length within Gestalt psychology.

Christian von Ehrenfels. **Christian von Ehrenfels (1859–1932)** studied in Vienna with Brentano and in 1890 wrote a paper titled "*Uber Gestaltqualitaten*" (*On Gestalt Qualities*). About this paper Smith (1994) says, "Almost all of the theoretical and conceptual issues which subsequently came to be associated with the Gestalt idea are treated at some point … at least in passing" (pp. 246–247). Max Wertheimer, the founder of Gestalt psychology, took several courses from Ehrenfels and clearly was influenced by him. Elaborating on Mach's notions of space and time forms, Ehrenfels said that our perceptions contain *Gestaltqualitaten* (form qualities) that are not contained in isolated sensations. No matter what pattern dots are arranged in, one recognizes the pattern, not the individual dots. Similarly, one cannot experience a melody by attending to individual notes; only when one experiences the notes together does one experience the melody. For both Mach and Ehrenfels, form is something that *emerges* from the elements of sensation. Their position was similar to one John Stuart Mill had taken many years earlier. With his idea of "mental chemistry," Mill had suggested that when sensations fuse, a new sensation totally unlike those of which it was composed could emerge.

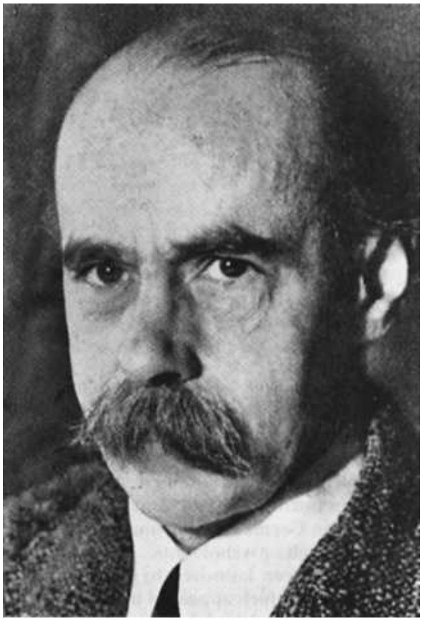
Developments in Physics. Because properties of magnetic fields were difficult to understand in terms of the mechanistic-elementistic view of Galilean–Newtonian physics, some physicists turned to a study of force fields, in which all events are interrelated. Wolfgang Köhler, one of the leading Gestalt psychologists, was well versed in physics and had even studied for a while with Max Planck, the father of quantum mechanics. In fact, it is accurate to say that **Gestalt psychology** represented an effort to model psychology after **field theory** instead of Newtonian physics.

Beyond Mach and physics, Kant and Ehrenfels, several of the Gestaltists were students of Stumpf at Berlin. Additionally, the American William James was clearly a part of the zeitgeist that gave rise to Gestalt psychology. Recall that in his *Principles*, James frequently sought to align phenomenological experience with the underlying physiology, which we will see was also the aim of Gestalt psychology.

THE FOUNDING OF GESTALT PSYCHOLOGY

In 1910 Max Wertheimer was on a train, on his way from Vienna to a vacation on the Rhineland, when he had an idea. The idea was that our perceptions are structured in ways that sensory stimulation is not. That is, our perceptions are different from the sensations that comprise them. To further explore this notion, Wertheimer got off the train at Frankfurt, bought a toy stroboscope (a device that allows still pictures to be flashed in such a way that makes them appear to move), and began to experiment in a hotel room. Clearly, Wertheimer was perceiving motion where none actually existed. To examine this phenomenon in more detail, he went to the University of Frankfurt, where a tachistoscope was made available to him. A tachistoscope can flash lights on and off for measured fractions of a second. Flashing two lights successively, Wertheimer found that if the time between the flashes was long (200 milliseconds or longer), the observer perceived two lights flashing on and off successively—which was, in fact, the case. If the interval between flashes was very short (30 milliseconds or less), both lights appeared to be on simultaneously. But if the interval between the flashes was about 60 milliseconds, it appeared that *one light* was moving from one position to the other. Wertheimer called this apparent movement the **phi phenomenon**, and his 1912 article "Experimental Studies of the Perception of Movement" describing this phenomenon is usually taken as the formal beginning of the school of Gestalt psychology.

It should be noted that Wertheimer was not the first to observe apparent motion. As early as 1824, Peter Roget presented a paper on the topic to the Royal Society of London (Boorstin, 1991). The Prague physiologist Sigmund Exner, with whom Wertheimer did postdoctoral research, also published a paper on the topic in 1875. The American psychologist George Stratton's similar article in



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Max Wertheimer

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1911 preceded Wertheimer's by several months, and by the time of both these articles, motion pictures were commonplace. Nevertheless, "It was Wertheimer who saw the deeper significance of the phenomenon, relating it to a coherent system of explanatory principles that gave it a central place in psychology" (Boynton & Smith, 2006, p. 131).

Wertheimer's research assistants at the University of Frankfurt were two recent Berlin doctoral graduates—Kurt Koffka and Wolfgang Köhler—both of whom acted as Wertheimer's subjects in his perception experiments. These three men would become the leading figures in Gestalt psychology.

Max Wertheimer

Max Wertheimer (1880–1943) was born into a wealthy, intellectual, and artistic Prague family. While Wertheimer was studying law at the University of Prague, his interest shifted to philosophy, and during this time he heard lectures by Ehrenfels. After a stint at the University of Berlin, where he attended Stumpf's classes, Wertheimer moved to the University of Würzburg, where in 1904 he received his doctorate, summa cum laude, under Külpe's supervision. His dissertation was on lie detection. Being at Würzburg at the time when Külpe and others were locked in debate with Wundt over the existence of "imageless thought" and over what introspection should focus on no doubt affected Wertheimer's thinking.

Between 1904 and 1910, Wertheimer held academic positions at the Universities of Prague, Vienna, and Berlin. He was at the University of Frankfurt from 1910 to 1916, the University of Berlin from 1916 to 1929, and again at Frankfurt from 1929 to 1933. Because of the chaos caused by the Nazi movement in Germany, Wertheimer, who was 53 years old at the time, decided to pursue his career elsewhere. Positions were offered to him at Cambridge, Oxford, and the University of Jerusalem; but in 1933 he accepted a position at the New School for Social Research, and he, his wife Anne, and their three children (Valentin, Michael, and Lise) sailed for New York. Wertheimer knew only German, and his first classes were taught in that language. After only five months, however, he began teaching and publishing in English. His second language posed a problem for Wertheimer because it sometimes interfered with his desire to express himself precisely. Michael Wertheimer and King (1994) give an example: "He … had some problems with mathematical terms; his students were occasionally baffled before they realized that his references to obtuse and acute 'angels' had nothing to do with heavenly beings but with trigonometric angles" (pp. 5–6).

Wertheimer had wide interests and, after arriving in the United States, wrote (in English) articles on truth (1934), ethics (1935), democracy (1937), and freedom (1940). Wertheimer intended to publish these articles as a collection, and his friend Albert Einstein wrote a forward. Although the collection was never published in English, it was eventually published in German under the editorship of Hans-Jurgen Walter (1991). Wertheimer wrote only one book, *Productive Thinking*, but he died suddenly in 1943 of a coronary embolism before it was published. *Productive Thinking* appeared posthumously in 1945. In October 1988, the German Society for Psychology bestowed upon Wertheimer its highest honor, the Wilhelm Wundt Plaque.

Kurt Koffka

Born the son of a well-known Berlin lawyer and initially educated by an English-speaking governess, **Kurt Koffka (1886–1941)** later received his doctorate from the University of Berlin in 1908, under the supervision of Stumpf. Koffka served as an assistant at Würzburg and at Frankfurt before accepting a position at the University of Giessen in central Germany, where he remained until 1924. During his stay at the University of Frankfurt, Koffka began his long association with Wertheimer and Köhler. In 1924 he came to the United States, and after holding visiting professorships at Cornell and the University of Wisconsin, he accepted a position at Smith College in Northampton, Massachusetts, where he remained until his death. As you may recall, it was also at Smith where Koffka influenced the ecological behaviorism of J. J. Gibson.

In 1922 Koffka wrote an article, in English, on Gestalt psychology. Published in the *Psychological Bulletin*, the article was titled "Perception: An Introduction to Gestalt-Theorie." This article is believed

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Smith College Archives, Smith College

Kurt Koffka

to have been responsible for most U.S. psychologists erroneously assuming that the Gestaltists were interested only in perception. The truth was that, besides perception, the Gestaltists were interested in many philosophical issues as well as in learning, thinking, development, physiology, and more. The reason for their early concentration on perception was that Wundt had been concentrating on perception, and he was the primary focus of their attack.

In 1921 Koffka published an important book on child psychology, later translated into English as *The Growth of the Mind: An Introduction to Child Psychology* (1924). In 1935, Koffka published *Principles of Gestalt Psychology*, which was intended to be a complete, systematic presentation of Gestalt theory. The latter book was dedicated to Köhler and Wertheimer in gratitude for their friendship and inspiration. Unlike Wertheimer, both Koffka and Köhler wrote extensively, and both were excellent stylists in their own way. Koffka was a man that women found attractive, and his writing style was directed toward making Gestalt psychology interesting to a wide audience, especially "for 19 year old girls" (Gibson, 1971, p. 3).

Wolfgang Köhler

Wolfgang Köhler (1887–1967) was born in Reval, Estonia, and received his doctorate in 1909 from the University of Berlin. Like Koffka, Köhler worked under the supervision of Stumpf. In 1909 Köhler went to the University of Frankfurt, where a year later he would participate with Wertheimer and Koffka in the research that was to launch the Gestalt movement. Köhler's collaboration with Koffka and Wertheimer was temporarily interrupted when, in 1913, the Prussian Academy of Sciences invited him to go to its anthropoid station on Tenerife, one of the Canary Islands, to study chimpanzees. Shortly after his arrival, World War I began, and his stay on Tenerife was prolonged for seven years. While at the anthropoid station, Köhler concentrated his study on the nature of learning in chimpanzees. He summarized his observations in the *Mentality of Apes* (1917/1925).

Psychologist Ronald Ley (1990) suggests that Köhler did more than observe chimpanzees on Tenerife. The Canary Islands are an unlikely place to establish an anthropoid research station because chimpanzees are not native to the region. The German Cameroons (a German colony in Africa) or a large zoo in Germany would have been more logical locations. Ley speculates that Köhler's reason for being in such a remote place was to observe British shipping activity for the German military. With a carefully concealed radio, Köhler informed German military officials whether or not British vessels were in the vicinity. If they were not, German ships could safely be refueled by nearby fuel ships. These activities were confirmed by Manuel, the 87-year-old keeper, handler, and trainer of Köhler's animals, and by two of Köhler's children. Ley also provides documents from both German and British naval archives that confirm an active espionage organization in the Canary Islands during World War I. Furthermore, the British

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Wolfgang Köhler

documents indicate that Köhler was strongly suspected of being part of that organization. Several times Köhler's home was searched by Spanish authorities on the orders of the British government. If these charges are true, it indicates that, at the time, Köhler was a loyal citizen of Germany. As we shall see, this loyalty was to change dramatically when the Nazis came to power.

Upon his return to Germany, Köhler accepted a professorship at the University of Göttingen (1921–1922, replacing G. E. Müller), and in 1922 he succeeded Stumpf as director of the Psychological Institute at the University of Berlin. This was a prestigious appointment, and it gave Gestalt psychology international recognition. Köhler's directorship was interrupted twice by trips to the United States: He was a visiting professor at Clark University (1925–1926), a William James lecturer at Harvard (1934–1935), and then a visiting professor at the University of Chicago. His *Gestalt Psychology* (1929/1970) was written in English and was especially intended for U.S. psychologists.

Like James, Köhler was highly critical of Fechner and offered psychophysics as an example of what could happen if measurement precedes an understanding of what is being measured:

> Apparently [Fechner] was convinced that measuring as such would make a science out of psychology…. Today we can no longer doubt that thousands of quantitative psychophysical experiments were made almost in vain. No one knew precisely what he was measuring. Nobody had studied the mental processes upon which the whole procedure was built. (Köhler, 1929/1970, p. 44)

Köhler believed that U.S. psychologists were making a similar mistake in their widespread acceptance of operationism (see Chapter 13). He gave as an example the operational definition of intelligence in terms of performance on intelligence tests. Here, he said, the measurements are precise (as they were in Fechner's work), but it is not clear exactly what is being measured. In the quotation that follows, note the similarity between Köhler's (1929/1970) criticisms of the use of IQ tests and those of Binet (see Chapter 10):

> [O]n the whole, the test scores show a satisfactory correlation with achievements both in school and in subsequent life. This very success, however, contains a grave danger. The tests do not show what specific processes actually participate in the test achievements. The scores are mere numbers which allow many different interpretations. Figuratively speaking, a given score may mean: degree 3 of "intelligence," together with degree 1 of "accuracy," with degree 4 of "ambition" and degree 3 of "quickness of fatigue." But it may also mean "intelligence" 6, "accuracy" 2, "ambition" 1 and "quickness of fatigue" 4—and so forth. Thus combinations of certain components in varying proportions may give precisely the same IQ. Obviously, this matters, … a child ought to be treated according to the nature and strength of the specific factors which co-operate in establishing his total IQ. This is not a new criticism, of course, but in view of the influence which the tests have gained in our schools it must be repeated. We are still much too easily satisfied by our tests because, as quantitative procedures, they look so pleasantly scientific. (p. 45)

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Back in Germany, the Nazis were harassing institutions of higher learning and professors, and Köhler's attitude toward the fatherland changed dramatically. Köhler complained bitterly and, on April 28, 1933, published the last article that publicly criticized the Nazis. In the following excerpt from that article, Köhler, who was not Jewish, commented on the Nazis' wholesale dismissal of Jews from universities and other positions:

> One of my friends told me: "The greatest German experimental physicist of the present time is Franck; many believe that he is the greatest experimental physicist of our age. Franck is a Jew, an unusually kind human being. Until a few days ago, he was professor at Göttingen, an honor to Germany and the envy of the international scientific community." [Perhaps the dismissal of Franck] shows the deepest reason why all these people are not joining [the Party]: they feel a moral imposition. They believe that only the quality of a human being should determine his worth, that intellectual achievement, character, and obvious contributions to German culture retain their significance whether a person is Jewish or not. (Henle, 1978, p. 940)

Eventually, the Nazi menace became too unbearable, and in 1935 Köhler immigrated to the United States. After lecturing at Harvard for a year, he accepted an appointment at Swarthmore College, in Pennsylvania, where he remained until his retirement in 1958. While at Swarthmore, he published his William James lectures as *The Place of Value in a World of Facts* (1938) and *Dynamics in Psychology* (1940), in which he discussed the relationship between field theory in physics and Gestalt psychology. After retiring, Köhler moved to New Hampshire, where he continued his writing and research at Dartmouth College. He also spent considerable time lecturing at European universities. Köhler died in Enfield, New Hampshire, on June 11, 1967. His last book, *The Task of Gestalt Psychology* (1969), was published posthumously.

Köhler's many honors included membership in the National Academy of Sciences and the American Academy of Arts and Sciences; numerous honorary degrees; being declared an *Ehrenbtirger* (honorary citizen) of the University of Berlin (an honor previously given to only two Americans—President John F. Kennedy and German born composer Paul Hindemith); the American Psychological Association's Distinguished Scientific Contributions Award (1956); and even the presidency of the American Psychological Association (1959).

Although born literally and philosophically in Germany, Gestalt psychology became highly influential in the United States. This is all the more impressive when you consider how the deck was stacked against them. They left leading positions in the most sophisticated Universities of the day to relocate to much smaller and less influential schools in a country at war with their homeland. Koffka was at Smith College (an undergraduate institution for women), Köhler was at Swarthmore (an undergraduate institution), and Wertheimer was affiliated with the New School for Social Research (which was not yet granting advanced degrees), making it virtually impossible for them to attract and train a new generation of doctoral students. Also, they were a handful of cognitively oriented psychologists amid the almost complete hegemony of American behaviorism. Indeed, if not for World War II, the history of psychology may have unfolded very differently.

They were not totally without friends, however. One of the earliest U.S. adherents of Gestalt psychology—and the person most associated with the relocation of the leading Gestaltists to America—was R. M. Ogden (Henle, 1984). Originally a Titchener student at Cornell, he completed his degree with Külpe at Würzburg, where he overlapped with Koffka. After stints at Missouri, Tennessee, and Kansas, Ogden returned to Cornell for the remainder of his career. Still, amid the dominance of behaviorism, they were strangers in a strange land.

Köhler described an experience he had shortly after arriving in the United States:

> In 1925, soon after my first arrival in this country, I had a curious experience. When once talking with a graduate student of psychology who was, of course, a

> behaviorist, I remarked that McDougall's psychology of striving seemed to me to be associated with certain philosophical theses which I found it hard to accept; but that he might nevertheless be right in insisting that, as a matter of simple observation, people do this or that in order to reach certain goals. Did not the student himself sometimes go to a post office in order to buy stamps? And did he not just now prepare himself for certain examinations to be held next Thursday? The answer was prompt: "I never do such things," said the student. There is nothing like a solid scientific conviction. (Henle, 1986, p. 120)

ISOMORPHISM AND THE LAW OF PRÄGNANZ

A basic question Wertheimer had to answer was how only two stimuli could cause the perception of motion. As previously noted, Wertheimer did not discover apparent motion; however, his *explanation* of the phenomenon was unique. As we have seen, Mach, Ehrenfels, and J. S. Mill all recognized that the whole was sometimes different from the sum of its parts, but they all assumed that somehow the whole (*Gestalt*) emerged from the characteristics of the parts. That is, after the parts (elements) are attended to, they somehow fuse and give rise to the whole experience. For example, attending to the primary colors causes the sensation of white to emerge, and attending to several musical notes causes the sensation of melody to emerge. This viewpoint still depends on a form of elementism and then association. For example, Wundt's explanation of apparent movement was that the fixation of the eyes changed with each successive presentation of the visual stimulus, and this causes the muscles controlling the eyes to give off sensations identical to those given off when real movement is experienced. Thus, because of past experience with such sensations (association), one experiences what appears to be movement. Because with apparent movement the sensation of movement is not contained in the sensations that cause it, Wundt believed that the experience exemplifies creative synthesis. Similarly, Helmholtz explained the phenomenon as an unconscious inference. Both Wundt and Helmholtz emphasized the role of learning in experiences like the phi phenomenon.

Through an ingenious demonstration, however, Wertheimer showed that explanations based on learning were not plausible. Again using a tachistoscope, he showed that the phi phenomenon could occur in two directions at the same time. Three lights were arranged as shown in Figure 14.1.

The center light was flashed on, and shortly thereafter the two other lights were flashed on, both at the same time. Wertheimer repeated this sequence several times. The center light appeared to fall to the left and right simultaneously, and because the eyes could not move in two directions at the same time, an explanation based on sensations from the eye muscles was untenable.

If the experience of psychological phenomena could not be explained by sensory processes, inferences, or fusions, how could it be explained? The Gestaltists' answer was that the brain contains structured fields of electrochemical forces that exist prior to sensory stimulation. The situation then is similar to one in which metal particles are placed into a magnetic field. For example, larger, more numerous particles will be distributed differently within the field than smaller, less numerous particles. In the case of cognitive experience, the important point is that fields of brain activity *transform* sensory

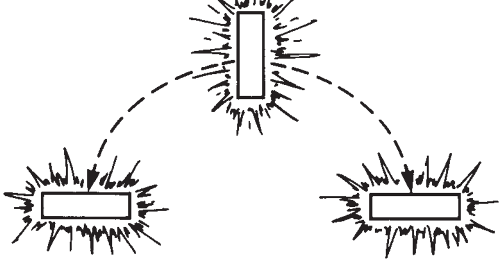

FIGURE 14.1

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data and give that data characteristics it otherwise would not possess. According to this analysis, the whole (electrochemical force fields in the brain) exists prior to the parts (individual sensations), and it is the whole that gives the parts their identity or meaning.

Psychophysical Isomorphism

To describe more fully the relationship between the field activity of the brain and conscious experience, the Gestaltists introduced the notion of **psychophysical isomorphism**, which Köhler described as follows: "Experienced order in space is always structurally identical with a functional order in the distribution of underlying brain processes" (1929/1970, p. 61). Elsewhere, Köhler said, "Psychological facts and the underlying events in the brain resemble each other in all their structural characteristics" (1969, p. 66).

The Gestalt notion of isomorphism stresses that the brain transforms incoming sensory data and that it is the transformed data that we experience consciously. The word *isomorphism* comes from the Greek *iso* ("similar") and *morphic* ("shape"). The patterns of brain activity and the patterns of conscious experience are structurally equivalent. The Gestaltists did not say that patterns of electrochemical brain activity are the same as patterns of perceptual activity. Rather, they said that perceptual fields are always caused by underlying patterns of brain activity. It was believed that, although the patterns of perceptual and brain activity might have some similarity, the two represent two totally different domains and certainly cannot be identical. The relationship is like that between a map of the United States and the actual United States; although the two are related in important ways, they are hardly identical.

The Constancy Hypothesis. With their notion of isomorphism, the Gestaltists opposed the **constancy hypothesis**, according to which there is a one-to-one correspondence between environmental stimuli and sensation. This one-to-one correspondence did not mean that sensations necessarily reflect accurately what is present physically. The psychophysicists, Helmholtz, Wundt, and the structuralists all accepted the constancy hypothesis while recognizing that large discrepancies could exist between psychological experiences and the physical events that cause them. Rather, the constancy hypothesis contended that individual physical events cause individual sensations and that these sensations remain isolated unless acted on by one or more of the laws of association or, in Wundt's case, are intentionally rearranged. This hypothesis was accepted by most British and French empiricists and was a cornerstone of Titchener's structuralism. The structuralists, following in the tradition of empiricism, viewed mental events as the passive reflections of specific environmental events.

The Gestaltists totally disagreed with the conception of brain functioning implied by the constancy hypothesis. By rejecting the constancy hypothesis, the Gestaltists rejected the empirical philosophy on which the schools of structuralism, functionalism, and behaviorism were based. Instead, as we have seen, the Gestaltists employed field theory in their analysis of brain functioning. In any physical system, energy is distributed in a lawful way, and the brain is a physical system. Michael Wertheimer (1987) elaborates this point:

> The Gestaltists argue that physical forces, when released, do not produce chaos, but their own internally determined organization. The nervous system, similarly, is not characterized by machinelike connections of tubes, grooves, wires, or switchboards, but the brain too, like almost all other physical systems, exhibits the dynamic self-distribution of physical forces. (p. 137)

Thus, instead of viewing the brain as a passive receiver and recorder of sensory information, the Gestaltists viewed the brain as a dynamic configuration of forces that transforms sensory information. They believed that incoming sensory data interacts with force fields within the brain to cause fields of mental activity; and like the underlying physical fields in the brain, these mental fields are organized configurations. The nature of the mental configurations depends on the totality of the incoming stimulation and the nature of the force fields within the brain, and any configurations that occur in the fields of brain activity would be experienced as perceptions (psychophysical isomorphism).

Top–Down Analysis. According to the Gestaltists, organized brain activity dominates our perceptions, *not* the stimuli that enter into that activity. For this reason, the whole is more important than the parts. The Gestaltists said that their analysis proceeded *from the top to the bottom* instead *of from the bottom to the top*, as had been the empirical tradition. In other words, they proceeded from the wholes to the parts instead of from the parts to the wholes. As Michael Wertheimer (1987) explains,

> This formulation involved a radical reorientation: the nature of the parts is determined by the whole rather than vice versa; therefore analysis should go "from above down" rather than "from below up." One should not begin with elements and try to synthesize the whole from them, but study the whole to see what its natural parts are. The parts of a whole are not neutral and inert, but structurally intimately related to one another. That parts of a whole are not indifferent to one another was illustrated, for example, by a soap bubble: change of one part results in a dramatic change in the entire configuration. This approach was applied to the understanding of a wide variety of phenomena in thinking, learning, problem solving, perception, and philosophy, and the movement developed and spread rapidly, with violent criticisms against it from outside, as well as equally vehement attacks on the outsiders from inside. (p. 136)

The Law of Prägnanz

The Gestaltists believed that the same physical forces that create configurations such as soap bubbles and magnetic fields also create configurations in the brain. The configurations of energy occurring in all physical systems always result from the total field of interacting forces, and these physical forces always distribute themselves in the most simple, symmetrical way possible under the circumstances. Therefore, according to the principle of psychophysical isomorphism, mental experiences, too, should be simple and symmetrical. The Gestaltists summarized this relationship between force fields in the brain and cognitive experience with their law of Prägnanz. The German word *Prägnanz* has no exact English counterpart, but an approximation is "full with meaning" or "precise." Sensory information may be fragmented and incomplete, but when that information interacts with the force fields in the brain, the resultant cognitive experience becomes complete and precise, organized—it becomes full of meaning. The **law of Prägnanz** states that psychological organization will always be as good as conditions allow under the prevailing circumstances, just as with other physical force fields. The law of Prägnanz asserts that all cognitive experiences will tend to be as organized, symmetrical, simple, and regular as they can be, given the pattern of brain activity at any given moment. This is what "as *good* as conditions allow" means.

It is tempting to categorize Gestalt psychology as nativistic, but the Gestaltists saw themselves as connecting with principles more basic than biology. Köhler said, "Such concepts as genes, inherited, and innate should never be mentioned when we refer to the basic … dynamic … processes in the nervous system" (1969, p. 89). According to Köhler, what governs brain activity are not genetically controlled programs but the *invariant dynamics* that govern *all* physical systems.

PERCEPTION

Perceptual constancy (*not* to be confused with the constancy hypothesis) refers to the way we respond to objects as if they are the same, even though the actual stimulation our senses receive may vary greatly:

> The man who approaches us on the street does not seem to grow larger as for simple optical reasons he should. The circle which

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> lies in an oblique plane does not appear as an ellipse; it seems to remain a circle even though its retinal image may be a very flat ellipse. The white object with the shadow across it remains white, the black paper in full light remains black, although the former may reflect much less light than the latter. Obviously, these three phenomena have something in common. The physical object as such always remains the same, while the stimulation of our eyes varies, as the distance, the orientation or the illumination of that constant object are changed. Now, what we seem to experience agrees with the actual invariance of the physical object much better than it does with the varying stimulations. Hence the terms constancy of size, constancy of shape and constancy of brightness. (Köhler, 1929/1970, pp. 78–79)

The empiricists explained perceptual constancies as the result of learning. The sensations provided by objects seen at different angles, positions, and levels of illumination are different, but through experience we learn to correct for these differences and to respond to the objects as the same. Woodworth (1931) described what our perceptions would be like, according to the empiricists, if the influence of learning could be removed:

> If we could for a moment lay aside all that we had learned and see the field of view just as the eyes present it, we should see a mere mosaic of variegated spots, free of meaning, of objects, of shapes or patterns. Such is the traditional associationist view of the matter. (pp. 105–106)

The Gestaltists disagreed. Köhler, for example, asserted that the constancies are a direct reflection of ongoing brain activity and *not* a result of sensation plus learning. The reason we experience an object as the same under varied conditions is that the *relationship* between that object and other objects remains the same, and therefore the mental experience (perception) is the same. The Gestaltists' explanation is simply an extension of the notion of psychophysical isomorphism. Using brightness constancy as an example, Bruno (1972) nicely summarizes this point:

> [Köhler] said that brightness constancy is due to the existence of a real constancy that is an existing *Gestalt* in the environment. This *Gestalt* is physical—really there as a pattern. It is the *ratio* of brightness of the figure to the brightness of the ground. This ratio remains constant for sunlight and shade. Let us say that a light meter gives a reading of 10 (arbitrary units) for a bikini in the sun. A reading from the grass in the sun is 5. The ratio of figure to ground is 10/5; or 2. Assume now that the girl in the bikini is in the shade, and the light meter gives a reading of 4 for the bikini. The grass in the shade gives a reading of 2. The ratio of figure to ground is 4/2; or 2—the same ratio as before. The ratio is a constant.… The constant ratio in the environment gives rise to a pattern of excitation in the nervous system. As long as the ratio does not change, the characteristics of the pattern of excitation do not change. Thus Köhler explained brightness constancy as a directly perceived *Gestalt* not derived from learning or the association of sensations. (p. 151)

Perceptual Gestalten

Through the years, the Gestaltists isolated over 100 configurations (Gestalten) by which visual information is arranged. We will sample only a few of them here.

The Figure–Ground Relationship. According to Danish psychologist Edgar Rubin (1886–1951), the most basic type of perception is the division of the perceptual field into two parts: the *figure*, which is clear and unified and is the object of attention, and the *ground*, which is diffuse and consists of

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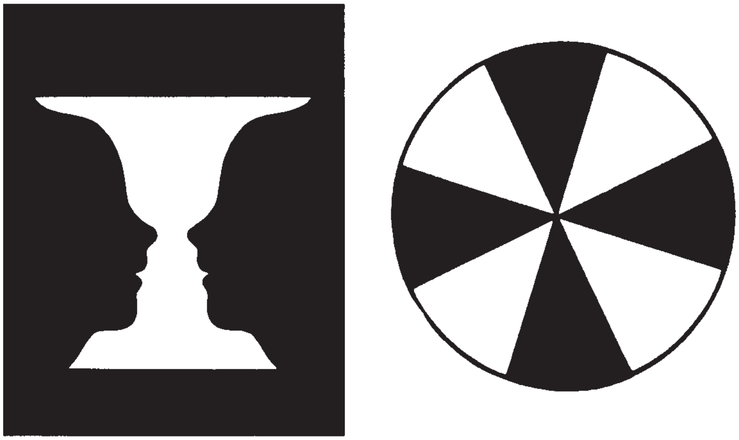

FIGURE 14.2

In each illustration, which is the figure and which is the ground?

Source: Adapted from Rubin, 1915/1921.

everything that is not being attended to. Such a division creates what is called a **figure–ground relationship**. Thus, what is the figure and what is the ground can be changed by shifting one's attention. Figure 14.2 demonstrates this phenomenon. When one focuses attention on the two profiles, one cannot see the vase, and vice versa. Similarly, when one focuses attention on the black cross, one cannot see the white cross, and vice versa. Figure 14.3, Jastrow's Duck/Rabbit (Chapter 11), makes the same point even more vividly. Additionally, it invites us to consider the role of context in the disambiguation of such figures. If you encountered this image among a variety of woodcuts, drawings, and photographs illustrating ducks and geese, then would you have first seen it as a rabbit?

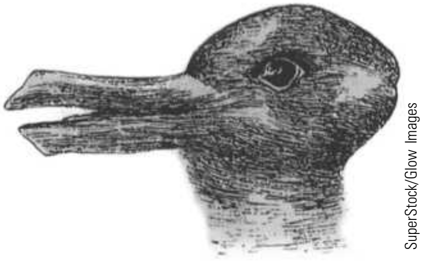

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FIGURE 14.3

Gestalt Principles of Perceptual Organization. In addition to describing figure–ground perception, the Gestaltists described the principles by which the elements of perception are organized. For example, stimuli that have continuity with one another will be experienced as a perceptual unit. To describe this principle, Wertheimer used the term *zusammenhängen* (literally, to hang together) and in English *intrinsic togetherness*, *imminent necessity*, and *good continuation*. Figure 14.4a provides an example of this **principle of continuity**. Note that the pattern that emerges cannot be found in any particular dot (element). Rather, because some dots seem to be tending in the same direction, one responds to them as a configuration (Gestalt). Most people would describe this figure as consisting of two curved lines.

When stimuli are close together, they tend to be grouped together as a perceptual unit. This is known as the **principle of proximity**. In Figure 14.4b, the lines and the Xs tend to be seen in groups of two, instead of as individual marks.

According to the principle of inclusiveness, when there is more than one figure, we are most

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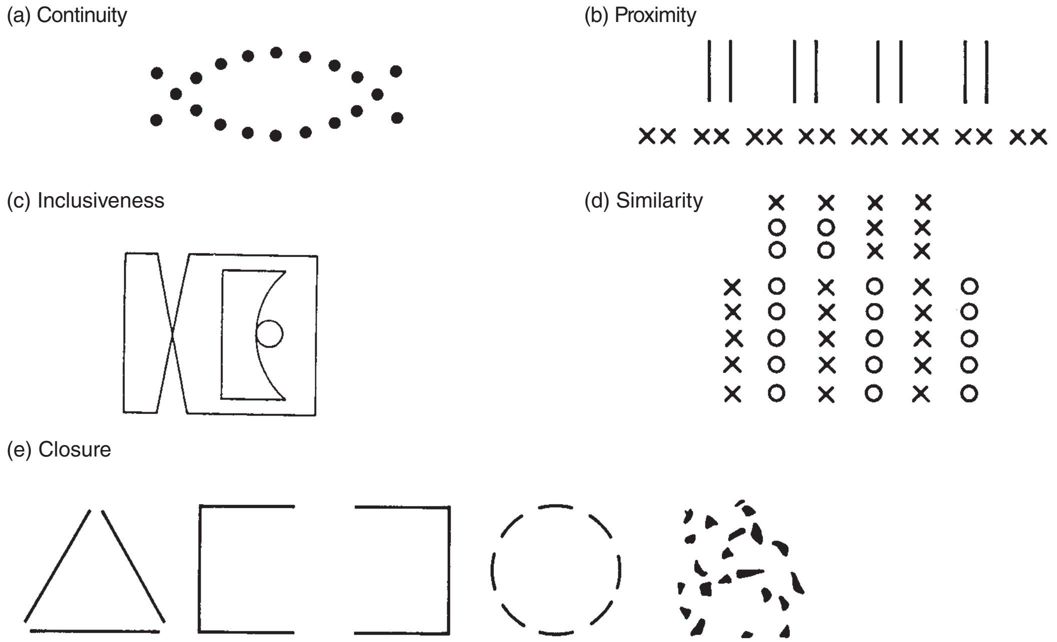

FIGURE 14.4

Examples of (a) principle of continuity, (b) principle of proximity, (c) principle of inclusiveness (Köhler, 1969), (d) principle of similarity, and (e) principle of closure.

Source: Sartain et al., 1973; used by permission of Prentice-Hall, Inc.

likely to see the figure that contains the greatest number of stimuli. If, for example, a small figure is embedded in a larger one, we are more likely to see the larger figure and not the smaller. The use of camouflage is an application of this principle. For example, ships painted the color of water and tanks painted the color of the terrain in which they operate blend into the background and are thus less susceptible to detection. In Figure 14.4c, the symbol V16 is difficult to see because so many of its components are part of a larger stimulus complex. Köhler (1969) believed that the principle of inclusiveness provided evidence against the empiricalistic explanation of perception, because most people would clearly have much more experience with the symbol Vl6 than with the figure shown in Figure 14.4c. Yet, the stronger tendency is to perceive the more inclusive figure.

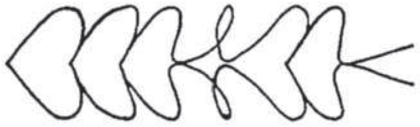

FIGURE 14.5

Köhler observed that if perception is determined by past experience (learning), then most people would perceive the familiar word "men" written in cursive along with its mirror image in Figure 14.5. Instead, however, most people perceive a less familiar figure, which somewhat resembles a horizontal row of heart-shaped forms. (If you cannot see the "men," cover the bottom half of the image.)

Objects that are similar in some way tend to form perceptual units. This is known as the

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principle of similarity. Twins, for example, stand out as a phenomenon in a crowd, and teams wearing different uniforms stand out as two groups on the field. In Figure 14.4d, the stimuli that have something in common stand out as perceptual units. We naturally see a row of Xs above a set of Os and Xs, then columns of Xs and Os below.

As we have stated, the Gestaltists believed in psychophysical isomorphism, according to which our conscious experience is directly related to patterns of brain activity, and the brain activity organizes itself into patterns according to the law of Prägnanz. Thus, it is quite likely that the patterns of brain activity are often better organized than the stimuli that enter them. This is clearly demonstrated in the **principle of closure**, according to which incomplete figures in the physical world are perceived as complete ones. As Figure 14.4e shows, even if figures have gaps in them—and thus are not truly circles, triangles, or rectangles—they are nonetheless experienced as circles, triangles, or rectangles. This is because the brain transforms the stimuli into organized configurations that are then experienced cognitively. For the same reason, in Figure 14.4e we see a person on horseback.

Subjective and Objective Reality

Because the brain acts on sensory information and arranges it into good configurations, what we are conscious of, and therefore what we act in accordance with at any given moment, is a product of the brain, not of the physical world. Koffka used this fact to distinguish between the geographical and the behavioral environments. For him, the **geographical environment** is the physical environment, whereas the **behavioral environment** is our subjective interpretation of the geographical environment. Koffka (1935/1963) used an old German legend to illustrate the important difference between the two environments:

> On a winter evening amidst a driving snowstorm a man on horseback arrived at an inn, happy to have reached a shelter after hours of riding over the wind-swept plain on which the blanket of snow had covered all paths and landmarks. The landlord who came to the door viewed the stranger with surprise and asked him whence he came. The man pointed in the direction straight away from the inn, whereupon the landlord, in a tone of awe and wonder, said: "Do you know that you have ridden across the Lake of Constance?" at which the rider dropped stone dead at his feet.
>
> In what environment, then, did the behavior of the stranger take place? The Lake of Constance? Certainly, because it is a true proposition that he rode across it.… But the psychologist knows something more: since the man died from sheer fright after having learned what he had "really" done, the psychologist must conclude that had the stranger known before, his riding behavior would have been very different from what it actually was. Therefore the psychologist will have to say: there is a second sense to the word environment according to which our horseman did not ride across the lake at all, but across an ordinary snow-swept plain.…
>
> What is true of the man who rode across the Lake of Constance is true of every behavior. Does the rat run in the maze *the experimenter* has set up? According to the meaning of the word "in," yes and no. Let us therefore distinguish between a *geographical* and a *behavioral* environment. Do we all live in the same town? Yes, when we mean the geographical, no, when we mean the behavioral. (pp. 27–28)

In other words, our own subjective reality governs our actions more than the physical environment does. Here we can again see the influence of German phenomenology—Brentano, Stumpf, and also Husserl. A common textbook example of how phenomenological experience differs from introspection is to imagine diverse people looking at the same

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object—say a tree. The adventurous boy longingly sees a wonderful opportunity to climb, play, and explore; the protective father woefully sees the dreadful opportunity for a fall, limbs to be pruned, and acorns to be raked; the biologist next door thoughtfully sees a perfect specimen of *Quercus macrocarpa* (Bur Oak) and the habitat it provides for dozens of other species of plants and animals. From a psychological perspective, do they really have the same perception when they see the tree?

THE GESTALT EXPLANATION OF LEARNING

As we have seen, the Gestaltists believed that brain activity tends toward a balance, or equilibrium, in accordance with the law of Prägnanz. This tendency toward equilibrium continues naturally unless it is somehow disrupted. According to the Gestaltists, the existence of a problem is one such disruptive influence. If a problem is confronted, a state of disequilibrium exists until the problem is solved. Because a state of disequilibrium is unnatural, it creates a tension with motivational properties that keeps the organism active until it solves the problem. Typically, an organism solves its problems perceptually by scanning the environment and cognitively trying one possible solution and then another until solved. Thus, the Gestaltists emphasized *cognitive* trial and error as opposed to *behavioral* trial and error. They believed that organisms come to *see* solutions to problems.

Insight

Köhler did much of his work on learning between 1913 and 1917 when he was on the island of Tenerife during World War I. In a typical experiment, using apes as subjects, Köhler suspended a desired object—for example, a banana—in the air just out of the animal's reach. Then he placed objects such as boxes and sticks, which the animal could use to obtain the banana, in the animal's environment. By stacking one or more boxes under the banana or by using a stick, the animal could reach the banana. In one case, the animal needed to join two sticks together in order to reach a banana. The photographs show the problem-solving activities of some of Köhler's apes.

In studying learning, Köhler also employed so-called detour (*umweg*—literally, other way) problems, problems in which the animal could see its goal but could not reach it directly. To solve the problem, the animal had to learn to take an indirect route to the goal. Figure 14.6 shows a typical detour problem. Köhler found that although chickens had great difficulty with such problems, apes solved them with ease.

Köhler noted that during a problem's presolution period, the animals appeared to weigh the situation—that is, to test various hypotheses. This is what Tolman referred to as cognitive, or vicarious, trial and error. Then, at some point, the animal achieved *insight* into the solution and behaved according to that insight. For the Gestaltists, a problem can exist in only two stages: It is either unsolved or solved—there is no in-between. According to the Gestaltists, the reason that Thorndike and others had found what appeared

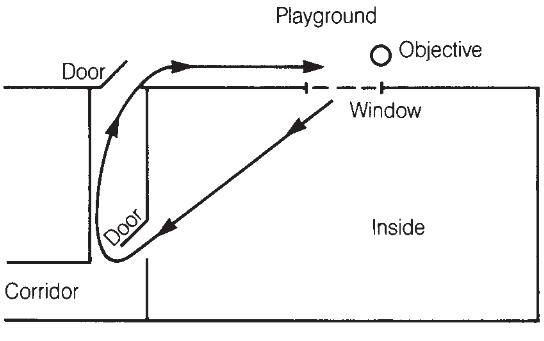

FIGURE 14.6

A typical detour problem that Köhler used to study the learning process.

Source: Köhler (1917/1925).

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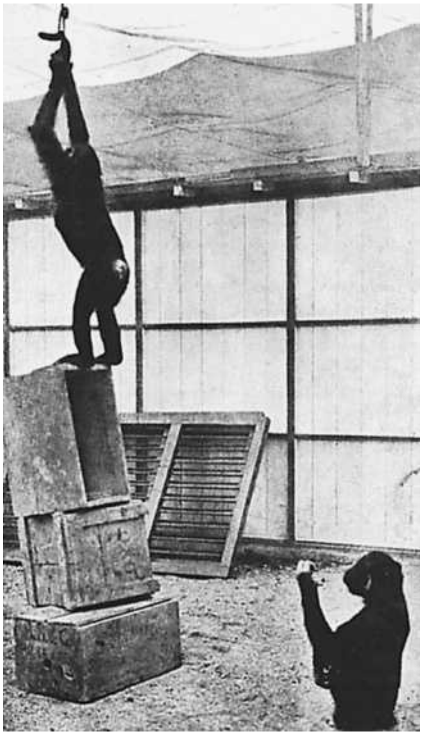

An ape named Grande using a stack of boxes to obtain food as Sultan watches.

The Mentality of Apes by W. Kohler, 1917/1925, London: Routledge and Kegan Paul Ltd. Reproduced by permission of Taylor & Francise Books UK.

Chica beating down her objective with a pole.

The Mentality of Apes by W. Kohler, 1917/1925, London: Routledge and Kegan Paul Ltd. Reproduced by permission of Taylor & Francise Books UK.

to be incremental learning was that all ingredients necessary for the attainment of insight had not been available to the animal. But if a problem is presented to an organism along with those things necessary for the problem's solution, **insightful learning** typically occurs. According to the Gestaltists, insightful learning is much more desirable than learning achieved through either rote memorization or behavioral trial and error. Hergenhahn and Olson (2005) summarize the conclusions that the Gestaltists reached about insightful learning:

> Insightful learning is usually regarded as having four characteristics: (1) the transition from presolution to solution is sudden and complete; (2) performance based on a solution gained by insight is usually smooth and free of errors; (3) a solution to a problem gained by insight is retained for a considerable length of time; (4) a principle gained by insight is easily applied to other problems. (p. 276)

Transposition

To explore further the nature of learning, Köhler used chickens as subjects. In one experiment, he placed a white sheet and a gray sheet of paper on the ground and covered both with grain. If a chicken pecked at the grain on the white sheet, it was shooed away; but if it pecked at the grain on the gray sheet, it was allowed to eat. After many trials, the chickens learned to peck at the grain on only the gray sheet.

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The question is, What did the animals learn? Thorndike, Hull, and Skinner would say that reinforcement strengthened the response of eating off the gray paper. To answer the question, Köhler proceeded with phase two of the experiment: He replaced the white paper with a sheet of black paper. Now the choice was between a gray sheet of paper, the one for which the chickens had received reinforcement, and a black sheet. Given this choice, most reinforcement theorists would have predicted that the chickens would continue to approach the gray paper. The vast majority of the chickens, however, approached the black paper. Köhler's explanation was that the chickens had not learned a stimulus-response association or a specific response but a *relationship*. In this case, the animals had learned to approach the *darker* of the two sheets of paper. If, in the second phase of the experiment, Köhler had presented a sheet of paper of a lighter gray than the one on which the chickens had been reinforced, the chickens would have continued to approach the sheet on which they had previously been fed because it would have been the darker of the two.

Thus, for the Gestaltist, an organism learns principles or relationships, not specific responses to specific situations. Once it learns a principle, the organism applies it to similar situations. This was called **transposition**, Gestalt psychology's explanation of transfer of training. The notion of transposition is contrary to Thorndike's identical-elements theory of transfer, according to which the similarity (common elements) between two situations determines the amount of transfer between them.

The Behaviorists' Explanation of Transposition. The Gestalt theory explanation of transposition did not go unchallenged. In 1937, Kenneth Spence, the major spokesman for Hullian psychology, came up with an ingenious alternative explanation. Hergenhahn and Olson (2005) summarize:

> Suppose, said Spence, that an animal is reinforced for approaching a box whose lid measures 160 sq. cm., and not reinforced for approaching a box whose lid measures 100 sq. cm. Soon the animal will learn to approach the larger box exclusively. In phase two of this experiment, the animal chooses between the 160 sq. cm. box and the box whose lid is 256 sq. cm. The animal will usually choose the larger box (256 sq. cm.) even though the animal had been reinforced specifically for choosing the other one (160 sq. cm.) during phase one. This finding seems to support the relational learning point of view.
>
> Spence's behavioristic explanation … assumed that the tendency to approach the positive stimulus (and the generalization of this tendency) is stronger than the tendency to avoid the negative stimulus (and the generalization of this tendency). What behavior occurs will be determined by the algebraic summation of the positive and negative tendencies.
>
> Whenever there is a choice between two stimuli, the one eliciting the greatest net approach tendency will be chosen. In the first phase of Spence's experiment, the animal chose the 160 sq. cm. box over the 100 sq. cm. box because the net positive tendency was 51.7 for the former and 29.7 for the latter. In phase two, the 256 sq. cm. box was chosen over the 160 sq. cm. box because the net positive tendency was 72.1 for the former and still 51.7 for the latter. (pp. 279–280)

Spence's explanation had the advantage of predicting the circumstances under which transposition would not occur, although interestingly neither the Gestalt nor the more complex behaviorist alternative can predict for all transpositional phenomena.

PRODUCTIVE THINKING

Wertheimer was concerned with the application of Gestalt theory to education. As mentioned, his book *Productive Thinking* was published posthumously in 1945. Under the editorship of Wertheimer's son

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Michael, this book was later revised and expanded, and it was republished in 1959. The conclusions Wertheimer reached about **productive thinking** were based on personal experience, experimentation, and interviews with individuals considered excellent problem solvers, such as Einstein.

> Those were wonderful days, beginning in 1916, when for hours and hours I was fortunate enough to sit with Einstein, alone in his study, and hear from him the story of the dramatic developments which culminated in the theory of relativity. (Max Wertheimer, 1945/1959, p. 213)

Wertheimer contrasted learning according to Gestalt principles with rote memorization governed by external reinforcement and the laws of association. The former is based on an understanding of the nature of the problem. As we have seen, the existence of a problem creates a cognitive disequilibrium that lasts until the problem is solved. The solution restores a cognitive harmony, and this restoration is all the reinforcement the learner needs.

Because learning and problem solving are personally satisfying, they are governed by **intrinsic** (internal) **reinforcement** rather than **extrinsic** (external) **reinforcement**. Wertheimer thought that we are motivated to learn and to solve problems because it is personally satisfying to do so, not because someone or something else reinforces us for doing so. Because learning governed by Gestalt principles is based on an understanding of the structure of the problem, it is easily remembered and generalized to other relevant situations.

Wertheimer believed that some learning did occur when mental associations, memorization, drill, and external reinforcement are employed but that such learning is usually trivial. He gave as examples of such learning associating a friend's name with his or her telephone number, learning to anticipate correctly a list of nonsense syllables, and a dog learning to salivate to a certain sound. Unfortunately, according to Wertheimer, this is the type of learning that most schools emphasize.

In Wertheimer's analysis, teaching that emphasizes logic does not fare much better than rote memorization. Supposedly, logic guarantees that one will reach correct conclusions. Teaching based on such a notion, said Wertheimer, assumes that there is a correct way to think and that everyone should think that way. But like rote memorization, learning and applying the rules of logic stifle productive thinking because neither activity is based on the realization that problem solving involves the total person and is unique to that person:

> According to Wertheimer, reaching an understanding involves many aspects of learners, such as their emotions, attitudes, and perceptions, as well as their intellects. In gaining insight into the solution to a problem, a student need not—in fact, should not—be logical. Rather, the student should cognitively arrange and rearrange the components of the problem until a solution based on understanding is reached. Exactly how this process is done will vary from student to student. (Hergenhahn & Olson, 2005, p. 281)

Wertheimer's *Productive Thinking* is filled with delightful examples of productive problem solving. One involves a childhood experience of Carl Friedrich Gauss, who went on to become a famous mathematician. Gauss's teacher asked the class to add the numbers from 1 through 10 and report the sum as soon as it was attained. While the other students were just beginning to solve the problem, Gauss raised his hand and correctly reported the sum as 55. When the teacher asked Gauss how he arrived at the answer so quickly, he said,

> [H]ad I done it by adding 1 and 2, then 3 to the sum, then 4 to the new result, and so on, it would have taken very long; and, trying to do it quickly, I would very likely have made mistakes. But you see, 1 and 10 make eleven, 2 and 9 are again—must be—11! And so on! There are 5 such pairs; 5 times 11 makes 55. (Wertheimer, 1945/1959, p. 109)

Gauss's solution was based on a flexible, creative approach to the problem rather than on standard, mechanical rules. Similarly, Michael Wertheimer (1980) describes an experiment that Katona originally performed in 1940. Katona showed subjects the following 15 digits and told them to study them for 15 seconds:

1 4 9 1 6 2 5 3 6 4 9 6 4 8 1

With only these instructions, most people attempt to memorize as many digits as possible in the allotted time. Indeed, Katona found that most subjects could reproduce only a few of the numbers correctly; and when tested a week later, most subjects remembered none.

Katona asked another group of subjects to look for a pattern or theme running through the numbers. Some individuals in this group realized that the 15 digits represented the squares of the digits from 1 to 9. These subjects saw a principle that they could apply to the problem and were able to reproduce all numbers correctly, not only during the experiment but also for weeks after. In fact, those individuals could no doubt reproduce the series correctly for the rest of their lives. Gauss's experience and Katona's experiment thus supported Wertheimer's belief that learning and problem solving based on Gestalt principles has many advantages over rote memorization or problem solving based on formal logic.

Memory

The Gestaltists maintained that the tendency toward perceptual organization and cognitive equilibrium is derived from the fact that the brain is a physical system and, as such, distributes its activity in the simplest, most concise configuration possible under any circumstances. *What* the brain organizes, however, is provided by sensory experience, and this provides an experiential component to Gestalt theory. Another experiential component is apparent in the Gestaltists' treatment of memory.

Koffka assumed that each physical event we experience gives rise to specific activity in the brain. He called the brain activity caused by a specific environmental event a **memory process**. When the environmental event terminates, so does the brain activity it caused. However, a remnant of the memory process—a **memory trace**—remains in the brain. Once the memory trace is formed, all subsequent related experience involves an interaction between the memory process and the memory trace. For example, when we experience a cat for the first time, the experience creates a characteristic pattern of brain activity; this is the memory process. After the experience is terminated, the brain registers its effects; this is the memory trace. The next time we experience a cat, the memory process elicited interacts with the already existing trace from the first experience. The conscious experience will be the result of both the present memory process *and* the trace of previously related experiences. Furthermore, a trace "exerts an influence on the process in the direction of *making it similar to the process which originally produced the trace*" (Koffka, 1935/1963, p. 553).

According to this analysis, we are aware of and remember things in general terms rather than by specific characteristics. Instead of seeing and remembering such things as cats, clowns, or elephants, we see and remember "catness," "clownness," and "elephantness." This is because the trace of classes of experience records what those experiences have in common—for example, those things that make a cat a cat. With more experience, the trace becomes more firmly established and more influential in our perceptions and memories. The individual trace gives way to a **trace system**, which is the consolidation of a number of interrelated experiences. In other words, a trace system records all our experiences with, say, cats. The interaction of traces and trace systems with ongoing brain activity (memory processes) results in our perceptions and memories being smoother and better organized than they otherwise would be. For example, we remember irregular experiences as regular, incomplete experiences as complete, and unfamiliar experiences as familiar. Trace systems govern our memories of particular things as well as of general categories. For example, the memory of one's own dog, cat, or mother will tend to be a composite of memories of experiences that occurred over a long period of time and under a wide variety of circumstances.

Like everything else addressed by Gestalt theory, memory is governed by the law of Prägnanz. That is, we tend to remember the essences of our experiences. The brain operates in such a way as to make memories as simple and symmetrical as is possible under the circumstances. If you have had a course in cognitive psychology you should see the similarity between Koffka's ideas and current considerations of concept formation, categorization, and schema.

KURT LEWIN'S FIELD THEORY

American Psychological Association

Kurt Lewin

Born in Mogilno, Germany, **Kurt Lewin (1890–1947)** received his doctorate in 1914 from the University of Berlin, under the supervision of Stumpf. After several years of military service, for which he earned Germany's Iron Cross, Lewin returned to the University of Berlin where he held various positions until 1932 and where he worked with Wertheimer, Koffka, and Köhler. Although Lewin is usually not considered a founder of Gestalt psychology, he was an early disciple, and most of his work can be seen as an extension or application of Gestalt principles to the topics of motivation, personality, and group dynamics.

Lewin was a visiting lecturer at Stanford University in 1932 and from 1933 to 1935 at Cornell. In 1935 he became affiliated with the Child Welfare Station at the University of Iowa as a professor of child psychology. In 1944 he created and directed the Research Center for Group Dynamics at the Massachusetts Institute of Technology. Lewin was always energetic and well-liked. Rensis Likert (1903–1981), of "Likert scale" fame, called him a "great scientist, a great teacher and a great man" (1947). Although Lewin died only three years after starting his work on group dynamics, the influence of this work was profound and is still evident in psychology today. Patnoe (1988) for example, provides a number of interviews with prominent experimental social psychologists who were either directly or indirectly influenced by Lewin.

Lewin (1935) distinguished between Aristotle's view of nature, which emphasizes inner essences and categories, and Galileo's view, which emphasizes outer causation and the dynamics of forces. For Aristotle various natural objects fall into categories according to their essence, and everything that members of a certain category have in common defines the essence of members of that category. Unless external forces interfere, all members of a category have an innate tendency to manifest their essence. For example, all elephants would, unless interfered with by accidental circumstances, manifest the essence of elephantness. In this world of distinct classes, internal forces drive the members of the classes to become what their essence dictates they must become. Aristotle saw individual differences as distortions caused by external forces interfering with an object's or organism's natural growth tendencies. He emphasized the common attributes that members of a certain class possess, not their differences.

According to Lewin, Galileo revolutionized science when he changed its notion of causation.

For Galileo the behavior of an object or organism is determined by the total forces acting on the object or organism at the moment. For example, whether a body falls or not—and if it falls, how fast—is determined by its total circumstances and not by the innate tendency for heavy bodies to fall and light ones to rise. For Galileo, causation springs not from inner essences but from physical forces; thus, he eliminated the idea of distinct categories characterized by their own essences and their own associated drives. The interaction of natural forces causes everything that happens; there are no accidents. Even so-called unique events are totally comprehensible if the dynamic forces acting on them are known.

For Lewin (1935), too much of psychology was still Aristotelian. Psychologists were still seeking inner determinants of behavior, such as instincts, and still attempting to place people in distinct categories, such as normal and abnormal. Lewin also saw stage theories as extensions of Aristotelian thinking—for example, a theory that says average two-year-olds act in certain ways and average three-year-olds in other ways. Any theory attempting to classify people into types was also seen as exemplifying Aristotelian thinking—for example, a theory that characterizes people as introverts or extroverts. According to Lewin, when Galileo's conception of causation is employed, all these distinct categories vanish and are replaced with a conception of universal causation—the view that everything that occurs is a function of the total influences occurring at the moment.

In psychology, switching from an Aristotelian to a Galilean perspective would mean deemphasizing such notions as instincts, types, and even averages (which imply the existence of distinct categories) and emphasizing the complex, dynamic forces acting on an individual at any given moment. For Lewin, these dynamic forces—and not any type of inner essences—explain human behavior.

Life Space

Probably Lewin's most important theoretical concept was that of life space. A person's **life space** consists of all influences acting on him or her at a given time. These influences, called **psychological facts**, consist of an awareness of internal events (such as hunger, pain, and fatigue), external events (restaurants, restrooms, other people, stop signs, and angry dogs), and recollections of prior experiences (knowing that a particular person is pleasant or unpleasant, or knowing that one's mother tends to say yes to certain requests and no to others). The only requirement for something to be a psychological fact is that it exist in a person's awareness at the moment. A previous experience is a psychological fact only if one recalls it in the present. Lewin summarized his belief concerning psychological facts in his **principle of contemporaneity**, which states that only those facts that are currently present in the life space can influence a person's thinking and behavior. Unlike Freud and others, Lewin believed that experiences from infancy or childhood can influence adult behavior only if those experiences are reflected in a person's current awareness.

Not only does a person's life space reflect real personal, physical, and social events, but it also reflects imaginary events. If a person believes he or she is disliked by someone, that belief, whether it is true or not, will influence his or her interactions with that person. If we believe we are incapable of doing something, we will not attempt to do it, regardless of what our true capabilities are. For Lewin, subjective reality governs behavior, not physical reality. One could be physically in a classroom but mentally pondering a forthcoming social engagement. If so, one would be oblivious to what was going on in the classroom. Again, Lewin believed that a person's thinking and behavior at any given moment are governed by the totality of psychological facts (real or imagined) present, and that totality constitutes a person's life space.

According to Lewin, if a need arises, the life space is articulated with facts that are relevant to the satisfaction of that need. For example, if one is hungry, psychological facts related to obtaining and ingesting food dominate one's life space. Some facts facilitate the satisfaction of the need (such as having money, the availability of food)

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and some facts inhibit its satisfaction (having other urgent commitments, being on a restrictive diet). Often two or more needs can exist simultaneously, and the articulation of the life space can become quite complex. The life space, then, is dynamic, reflecting not only changing needs but also dominant environmental experiences such as hearing a doorbell ring or a person cry for help.

Motivation

Like the other Gestaltists, Lewin believed that people seek a cognitive balance. We saw how Köhler used this assumption in his explanation of learning. Lewin used the same assumption in his explanation of motivation. According to Lewin, both biological and psychological needs cause tension in the life space, and the only way to reduce the tension is through satisfaction of the need. Psychological needs, which Lewin called **quasi needs**, include such intentions as wanting a car, wanting to go to a concert, or wanting to go to medical school.

Doing her doctoral work under Lewin's supervision, Bluma Zeigarnik (1927) tested Lewin's tension-system hypothesis concerning motivation. According to this hypothesis, needs cause tensions that persist until the needs are satisfied. It was Lewin's custom to have long discussions with his students in a cafe while drinking and snacking. Apparently, the tension-system hypothesis occurred to him as a result of an experience he had during one of these informal discussions. As Marrow (1969) reports,

> On one such occasion, somebody called for the bill and the waiter knew just what everyone had ordered. Although he hadn't kept a written reckoning, he presented an exact tally to everyone when the bill was called for. About a half hour later Lewin called the waiter over and asked him to write the check again. The waiter was indignant. "I don't know any longer what you people ordered," he said. "You paid your bill." In psychological terms, this indicated that a tension system had been building up in the waiter as we were ordering and upon payment of the bill the tension system was discharged. (p. 27)

In her formal testing of Lewin's hypothesis, Zeigarnik (1927) assumed that giving a subject a task to perform would create a tension system and that completion of the task would relieve the tension. In all, Zeigarnik gave 22 tasks to 138 subjects. The subjects were allowed to finish some tasks but not others. Zeigarnik later tested the subjects on their recall of the tasks, and she found that the subjects remembered many more of the *uncompleted* tasks than the completed ones. Her explanation was that for the uncompleted tasks the associated tension is never reduced; therefore, these tasks remain as intentions, and as such they remain part of the person's life space. The tendency to remember uncompleted tasks better than completed ones has come to be called the **Zeigarnik effect**.

A year after Zeigarnik did her research, another Russian student, Maria Ovsiankina (1928), who was also working with Lewin, found that individuals would rather resume interrupted tasks than completed ones. Her explanation for this was the same as the one for the Zeigarnik effect. As for Zeigarnik, Zusne (1995) notes that she went on to become the "mother" of clinical psychology in the Soviet Union.

Conflict. Although the fact that human tendencies often conflict was discussed by the likes of Plato, St. Paul, Spinoza, and Hegel, and was made the cornerstone of psychoanalysis by Freud (see Chapter 16), it was Lewin who first investigated such conflict experimentally (see, for example, Lewin, 1935). Lewin concentrated his study on three types of conflict. An **approach–approach conflict** occurs when a person is attracted to two goals at the same time, such as needing to choose from two movies you want to see at the same cinema or between two excellent graduate programs after being accepted by both. An **avoidance–avoidance conflict** occurs when a person is repelled by two unattractive goals at the same time, such as when one must get a job or not have enough money, or study for an examination or get a bad grade. An **approach–avoidance conflict** is often the most difficult to resolve because it involves only one goal about which one has mixed feelings, such as when having a steak is an appealing idea but it is the most expensive item on the menu. The types of conflict Lewin studied can be diagrammed as follows (where *p* symbolizes a person):

Goal 1		**Goal 2**	
+ ←	*p*	→ +	Approach–Approach Conflict
> →	*p*	← <	Avoidance–Avoidance Conflict
± ↔	*p*		Approach–Avoidance Conflict

Beyond Lewin, significant research on conflict was performed by Neal Miller (Hull's student we introduced in the last chapter) as part of his highly regarded effort to precisely define and evaluate a number of psychoanalytic concepts within the context of learning theory (see, for example, Dollard & Miller, 1950; Miller, 1944, 1959, 1964).

Group Dynamics

In his later years, Lewin extended Gestalt principles to the behavior of groups in applied settings. This work is sometimes called "action research." According to Lewin, a group can be viewed as a physical system just like the brain can. In both cases, the behavior of individual elements is determined by the configuration of the existing field of energy. Therefore, the nature or configuration of a group will strongly influence the behavior of its members. Among the members of each group, there exists what Lewin called a dynamic interdependence. Lewin's studies of **group dynamics** led to what are now called encounter groups and sensitivity training, as well as many different leadership programs.

One oft-cited example of Lewin's action research in group dynamics involved changing attitudes about food during World War II, when popular products, such as good meats, were being rationed. In the first part of the experiment, housewives heard a dynamic lecture promoting the nutritional and culinary merits of offal (for example, brains, liver, kidneys, and heart) or participated in a group discussion of the same material. Following up, results showed that discussion group members (especially those who made a public verbal commitment to try the new meats) were vastly more likely to buy and prepare these foods (3% vs 32%).

In another study, Lewin, Lippitt, and White (1939) investigated the influence of various types of leadership on group performance. Boys were matched and then placed in (1) a *democratic group*, in which the leader encouraged group discussion and participated with the boys in making decisions; (2) an *authoritarian group*, in which the leader made all decisions and told the boys what to do; or (3) a *laissez-faire group*, in which no group decisions were made and the boys could do whatever they wanted. The researchers found that the democratic group was highly productive and friendly, the authoritarian group was highly aggressive, and the laissez-faire group was unproductive. Lewin et al. concluded that group leadership influenced the Gestalt characterizing the group and, in turn, the attitude and productivity of the group's members.

When Lewin died suddenly in 1947, of a heart attack, he was at the height of his career and influence. He was only 57 years old at the time and had been in the United States for only 12 years.

THE IMPACT OF GESTALT PSYCHOLOGY

Wertheimer, Köhler, and Koffka are frequently presented in texts (even some history texts) as all there was to Gestalt psychology (although Rubin and Lewin do usually get at least a mention). This is very much incorrect, but the reasons for such a misconception are interesting.

As we have noted, in the years leading up to World War II, the Gestaltists had taken control of the key positions in psychology at Germany's premier Universities. Building upon and consolidating the works of Stumpf, Müller, Külpe, and Husserl, Gestalt psychology had become the prevailing school. As such,

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dozens of other German psychologists would have readily accepted the mantle. Examples include prominent perceptual theorists such as Erich von Hornbostel (sound localization), Erich Jaensch (eidetic imagery), and David Katz (color vision); early cognitive psychologists such as Karl Bühler (cognitive development) and Karl Dunker (creativity); as well as the pioneering clinical neuroscientist Kurt Goldstein.

The war scattered these researchers to the U.S., England, Russia, and Scandinavia, costing the school the types of social support—such as controlling journals, training graduate students, working with like-minded colleagues, etc.—required for sustaining a successful scientific paradigm (Kuhn, 1996). Many flourished in their new homes, but others did not (Dunker committed suicide at age 36). Cartwright (1979) quipped that Adolph Hitler then, ironically had a major influence upon the history of psychology.

As we have seen, Americans who had recently studied in Germany (for example, Ogden, Tolman) were usually already positively disposed toward the Gestaltists. Once in the United States, Gestalt psychology was influential even amid the prevailing behaviorist paradigm. Many of the major American perceptual theorists—such as J. J. Gibson, Harry Helson, Hans Wallach, and Rudolph Arnheim—reflected Gestalt perspectives. Molly Harrower (1906–1999) worked with both Koffka and Goldstein before becoming an internationally famous clinical psychologist as well as one of the first women in neuropsychology; and always embracing the label of Gestalt psychologist, Mary Henle (1913–2007) enjoyed a wonderful career as a historian of psychology.

The place where Gestalt psychology had its greatest impact, however, is social psychology. Beyond Lewin's contributions were those of his students in America, such as Tamara Dembo and Leon Festinger. We will briefly consider Festinger's theory of cognitive dissonance in Chapter 19. Indeed, the entire field of social cognition is built upon the works of "American Gestaltists" such as Fritz Heider's attribution theory, and Solomon Ash's work on conformity and person perception.

As an aside, one place where Gestalt psychology had little if any influence is in the clinical approach popularized by Fritz Perls known as Gestalt therapy (Henle, 1986). And of course, like any school in psychology, Gestalt psychology has had its share of criticism. Critics have said that many of its central terms and concepts are vague and therefore hard to pin down experimentally. Even the term *Gestalt*, the critics say, has never been defined precisely. The same is true for the law of Prägnanz, for *insight* and for *cognitive equilibrium*. As might be expected, the behaviorists attacked the Gestaltists' concern with consciousness, claiming that such a concern was a regression to the old metaphysical position that had caused psychology so many problems. Following a discussion with Köhler on Gestalt psychology, the illustrious neuropsychologist Karl Lashley said, "Excellent work—but don't you have religion up your sleeve?" (Henle, 1971b, p. 117). Despite these and other criticisms, however, Gestalt theory has clearly influenced almost every aspect of modern psychology. Sokal (1984) said the following about the influence of Gestalt psychology:

> [Gestalt psychology] enriched American psychology greatly and did much to counter the attractions of extreme behaviorism. If Gestalt psychology has today lost its identity as a school of thought—and very few of Koffka's, Köhler's, Wertheimer's, or Lewin's students call themselves Gestalt psychologists—it is not because the mainstream of American psychology has swamped their ideas. Rather, their work has done much to redirect this mainstream, which adopted many of their points of view. Few other migrating scientific schools have been as successful. (p. 1263)

In a thoughtful chapter titled "Rediscovering Gestalt Psychology," Henle (1985) discusses several important relationships that exist currently between Gestalt psychology and cognitive psychology. Many other writers have also considered the connections between the "cognitive revolution" and Gestalt psychology (for example, Gardner, 1985; Murray, 1995; Simon, 1992). We too will have more to say about the influence of Gestalt psychology on contemporary psychology in Chapters 19 and 20.

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SUMMARY

Attacking both the structuralists and the behaviorists for their elementism, the Gestaltists emphasized cognitive and behavioral configurations that could not be divided without destroying the meaning of those configurations. *Gestalt* is the German word for "whole," or "configuration." Antecedents of Gestalt psychology include Kant's contention that sensory experience is structured by the faculties of the mind; Mach's contention that the perception of space form and time form are independent of any specific sensory elements; Ehrenfels's observation that although form qualities emerge from sensory experience, they are different from that experience; J. S. Mill's notion of mental chemistry; James's contention that consciousness is like an ever-moving stream that cannot be divided into elements without losing its meaning; act psychology, which emphasizes the conscious acts of perceiving, sensing, and problem solving instead of the elements of thought; and the emergence of field theory in physics.

The 1912 publication of Wertheimer's article on the phi phenomenon usually marks the founding of the Gestalt school of psychology. The phi phenomenon indicates that conscious experience cannot be reduced to sensory experience. The contention that force fields in the brain determine consciousness was called psychophysical isomorphism, and the contention that brain activity is always distributed in the most simple, symmetrical, and organized way was called the law of Prägnanz.

According to the Gestaltists, the most basic perception is that of a figure–ground relationship. Perceptual principles that cause the elements of perception to be organized into configurations include continuity, by which stimuli following some pattern are seen as a perceptual unit; proximity, by which stimuli that are close together form a perceptual unit; similarity, by which similar stimuli form a perceptual unit; inclusiveness, by which a larger perceptual configuration masks smaller ones; and closure, by which incomplete physical objects are experienced psychologically as complete.

The Gestaltists viewed learning as a perceptual phenomenon. For them, the existence of a problem creates a psychological disequilibrium, or tension, that persists until the problem is solved. As long as there is tension, the person engages in an effort to find the solution to the problem. Problems remain in an unsolved state until insight into the solution is gained. Insightful learning is sudden and complete; it allows performance that is smooth and free of errors. Also, the person retains the information gained by insight for a long time and can easily transfer that information to similar problems. The application of a principle learned in one problem-solving situation to other similar situations is called transposition.

Productive thinking involves the understanding of principles rather than the memorization of facts or the utilization of formal logic. The Gestaltists thought that memory, like other psychological phenomena, is governed by the law of Prägnanz. Experience activates a brain activity called a memory process, which lasts as long as an experience lasts. After the memory process terminates, a trace of it remains, and that memory trace influences subsequent memories of similar objects or events. Eventually, a trace system develops that records the features that memories of a certain type have in common.

Lewin believed that psychology should not categorize people into types or emphasize inner essences. Rather, he believed psychology should attempt to understand the dynamic force fields that motivate human behavior. According to Lewin, anything influencing a person at a given moment is a psychological fact, and the totality of psychological facts that exists at the moment constitutes a person's life space. Lewin believed that both biological and psychological needs create a tension that persists until the needs are satisfied. The Zeigarnik effect, or the tendency to remember uncompleted tasks longer than completed ones, supported Lewin's theory of motivation. Lewin observed that intentions often conflict, as when one wants two desirable things at the same time, wants to avoid two undesirable things at the same time, or wants and does not want the same thing at the same time. With his work on group dynamics, Lewin showed that different types of group structures create different Gestalten that influence the performance of group members.

Gestalt psychology played a major role in directing the attention of psychologists away from insignificant bits of behavior and consciousness and toward the holistic aspects of behavior and consciousness. As with functionalism, many of the basic features of Gestalt psychology have been assimilated into modern psychology, and therefore Gestalt psychology has lost its distinctiveness as a school.

DISCUSSION QUESTIONS

1. Summarize the disagreements that the Gestaltists had with Wundt's experimental program, the structuralists, and the behaviorists.
2. Differentiate the molecular approach to psychology from the molar approach.
3. Describe similarities and differences that existed between the positions of Kant, Mach, Ehrenfels, James, Brentano, and the Gestaltists.
4. Explain what is meant by the contention that Gestalt theory used field theory as its model and that empirical-associationistic psychology used Newtonian physics as its model.
5. What is the phi phenomenon? What was its importance in the formation of the Gestalt school of psychology?
6. What is meant by the contention that Gestalt analysis proceeds from the top down rather than from the bottom up?
7. What is the law of Prägnanz? Describe the importance of this law to Gestalt psychology.
8. What is perceptual constancy? Give an example. How did the Gestaltists explain the perceptual constancies?
9. Briefly define each of the following: figure–ground relationship, principle of continuity, principle of proximity, principle of similarity, principle of inclusiveness, and principle of closure.
10. Distinguish between subjective and objective reality. According to the Gestaltists, which is more important in determining behavior? Give an example.
11. What is transposition? Summarize the Gestalt and the behavioristic explanations of this phenomenon.
12. For Wertheimer, what represents the best type of problem solving? Contrast this type of problem solving with rote memorization and logical problem solving.
13. Summarize the Gestalt explanation of memory. Include in your answer definitions of memory process, memory trace, and trace system. What does it mean to say that memory is governed by the law of Prägnanz?
14. What did Lewin mean by life space? Include in your answer the definition of *psychological fact*.
15. Summarize Lewin's theory of motivation. In your answer, discuss various types of conflicts.
16. What is the Zeigarnik effect? Describe the research used to demonstrate the effect.
17. Summarize Lewin's work on group dynamics.
18. Discuss some of the contributors to Gestalt psychology beyond Wertheimer, Koffka, and Köhler.
19. Summarize the impact that Gestalt psychology has had on contemporary psychology.

SUGGESTIONS FOR FURTHER READING

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GLOSSARY

Approach–approach conflict According to Lewin, the type of conflict that occurs when a person is attracted to two goals at the same time.

Approach–avoidance conflict According to Lewin, the type of conflict that occurs when a person is attracted to and repelled by the same goal at the same time.

Avoidance–avoidance conflict According to Lewin, the type of conflict that occurs when a person is repelled by two goals at the same time.

Behavioral environment According to Koffka, subjective reality.

Constancy hypothesis The contention that there is a strict one-to-one correspondence between physical stimuli and sensations, in the sense that the same stimulation will always result in the same sensation regardless of circumstances. The Gestaltists argued against this contention, saying instead that what sensation a stimulus elicits is relative to existing patterns of activity in the brain and to the totality of stimulating conditions.

Ehrenfels, Christian von (1859–1932) Said that mental forms emerge from various sensory experiences and that these forms are different from the sensory elements they comprise.

Elementism The belief that complex mental or behavioral processes are composed of or derived from simple elements and that the best way to understand these processes is first to find the elements of which they are composed.

Extrinsic reinforcement Reinforcement that comes from a source other than one's self.

Field theory That branch of physics that studies how energy distributes itself within physical systems. In some systems (such as the solar system), energy can distribute itself freely. In other systems (such as an electric circuit), energy must pass through wires, condensers, resistors, and so forth. In either type of system, however, energy will always distribute itself in the simplest, most symmetrical way possible *under the circumstances*. According to the Gestaltists, the brain is a physical system whose activity could be understood in terms of field theory.

Figure–ground relationship The most basic type of perception, consisting of the division of the perceptual field into a figure (that which is attended to) and a ground, which provides the background for the figure.

Geographical environment According to Koffka, physical reality.

Gestalt The German word meaning "configuration," "pattern," or "whole".

Gestalt psychology The type of psychology that studies whole, intact segments of behavior and cognitive experience.

Group dynamics Lewin's extension of Gestalt principles to the study of group behavior.

Holists Those who believe that complex mental or behavioral processes should be studied as such and not divided into their elemental components for analysis. (*See also* **Phenomenology**.)

Insightful learning Learning that involves perceiving the solution to a problem after a period of cognitive trial and error.

Intrinsic reinforcement The self-satisfaction that comes from problem solving or learning something. According to the Gestaltists, this feeling of satisfaction occurs because solving a problem or learning something restores one's cognitive equilibrium.

Koffka, Kurt (1886–1941) Worked with Wertheimer on his early perception experiments. Koffka is considered a cofounder of the school of Gestalt psychology.

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Köhler, Wolfgang (1887–1967) Worked with Wertheimer on his early perception experiments. Köhler is considered a cofounder of the school of Gestalt psychology.

Law of Prägnanz Because of the tendencies of the force fields that occur in the brain, mental events will always tend to be organized, simple, and regular. According to the law of Prägnanz, cognitive experience will always reflect the essence of one's experience instead of its disorganized, fragmented aspects.

Lewin, Kurt (1890–1947) An early Gestaltist who sought to explain human behavior in terms of the totality of influences acting on people rather than in terms of the manifestation of inner essences. Lewin was mainly responsible for applying Gestalt principles to the topics of motivation and group dynamics.

Life space According to Lewin, the totality of the psychological facts that exist in one's awareness at any given moment. (*See also* **Psychological fact**.)

Memory process The brain activity caused by the experiencing of an environmental event.

Memory trace The remnant of an experience that remains in the brain after an experience has ended.

Molar approach The attempt to focus on intact mental and behavioral phenomena without dividing those phenomena in any way.

Molecular approach The attempt to reduce complex phenomena into small units for detailed study. Such an approach is elementistic.

Perceptual constancy The tendency to respond to objects as being the same, even when we experience those objects under a wide variety of circumstances.

Phenomenology The study of intact, meaningful, mental phenomena.

Phi phenomenon The illusion that a light is moving from one location to another. The phi phenomenon is caused by flashing two lights on and off at a certain rate.

Principle of closure The tendency to perceive incomplete objects as complete.

Principle of contemporaneity Lewin's contention that only present facts can influence present thinking and behavior. Past experiences can be influential only if a person is presently aware of them.

Principle of continuity The tendency to experience stimuli that follow some predictable pattern as a perceptual unit.

Principle of proximity The tendency to perceptually group together stimuli that are physically close.

Principle of similarity The tendency to perceive as units stimuli that are physically similar to one another.

Productive thinking According to Wertheimer, the type of thinking that ponders principles rather than isolated facts and that aims at understanding the solutions to problems rather than memorizing a certain problem-solving strategy or logical rules.

Psychological facts According to Lewin, those things of which a person is aware at any given moment.

Psychophysical isomorphism The Gestaltists' contention that the patterns of activity produced by the brain—rather than sensory experience as such—causes mental experience.

Quasi needs According to Lewin, psychological rather than biological needs.

Trace system The consolidation of the enduring or essential features of memories of individual objects or of classes of objects.

Transposition The application of a principle learned in one learning or problem-solving situation to other similar situations.

Wertheimer, Max (1880–1943) Founded the school of Gestalt psychology with his 1912 paper on the phi phenomenon.

Zeigarnik effect The tendency to remember uncompleted tasks longer than completed ones.

15

Early Considerations of Mental Illness

WHAT IS MENTAL ILLNESS?

Although the condition we now refer to as **mental illness** has existed from at least the beginning of recorded history, the terms used to describe that condition have varied. Today, besides the term *mental illness*, we use such terms as *psychopathology* and *abnormal behavior*. At earlier times, terms such as *mad*, *lunatic*, *maniac*, and *insane* were used. Although the terms have changed, all refer to more or less the same type of behavior. As Maher and Maher (1985) explain,

> The old terms meant pretty much the same thing as the new terms replacing them. "Mad," for example, was an old English word meaning emotionally deranged and came in turn from an ancient root word meaning crippled, hurt; "insanity" comes from the root word "sanus" or free from hurt or disease, and thus "insane" means hurt or unhealthy; "lunacy" refers to the periodic nature of many psychopathological conditions and perhaps was originally intended to differentiate periodic madnesses from those in which the state was chronic and unremitting; "mania" refers to excess of passion or behavior out of control of the reason. (p. 251)

When we examine the behavior and cognitive processes thought to characterize mental illness, several recurring themes hinted at by this language become evident.

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Harmful Behavior. Most individuals possess a powerful motive to survive, and therefore we consider behavior contrary to that motive, such as self-mutilation or suicide, as abnormal. There have been cultural settings, however, in which harming oneself was considered desirable, such as when the Japanese viewed committing seppuku (suicide) as a way of restoring lost personal or family honor. Also, there have been cultural settings in which injuring another person or persons was sanctioned, such as in 17th- and 18th-century Italy, when castrating a child with musical talent to prepare him for an operatic career was an acceptable practice; or during warfare, when killing the enemy is encouraged. But generally, behavior that is harmful to oneself or others has been and is viewed as abnormal.

Unrealistic Thoughts and Perceptions. If a person's beliefs or perceptions differ markedly from those considered normal at a certain time and place in history, those beliefs and perceptions are taken as signs of mental illness. Using today's terminology, we say that people are having *delusions* if their beliefs are not shared by other members of the community. For example, it is considered delusional if a person believes that he or she can be transformed into some type of animal, such as a wolf or a bat. Similarly, we consider people abnormal if their perceptions do not correspond to those of other members of the community. Today we call such perceptions *hallucinations*. An example would be a person seeing a bountiful crop where others see only weeds or dirt. Both false beliefs (delusions) and false perceptions (hallucinations) are normally viewed as representing abnormality.

Inappropriate Emotions. When an individual consistently laughs when the mores of a community dictate that he or she should cry or cries when he or she should laugh, that person is often branded as mentally ill. Likewise, if a person's emotional reactions are considered extreme, as when extreme fear, sadness, or joy are displayed in situations where much more moderate levels of these emotions would be appropriate, the person is often suspected of being mentally disturbed. Inappropriate or exaggerated emotional responses have been and remain a criteria used in labeling a person as mentally ill.

Unpredictable Behavior. Sudden shifts in one's beliefs or emotions have also traditionally been taken as signs of psychopathology. For example, the person who is happy one moment and sad the next or who embraces one conviction only to have it displaced by another in a short period of time is rightly considered to be at least emotionally unstable. If such rapid shifts in moods or beliefs persist, the person is often characterized as mentally ill.

What these criteria of mental illness all have in common is that they define abnormality in terms of the behavior and thought processes of the average person in a community. Of course, the characteristics of this average person will vary according to the values of his or her culture, but it is always the average person's beliefs and behavior that serve as a frame of reference in determining mental illness.

Using the experiences of the average members of a community as a frame of reference in defining mental illness is as operative today as it has been throughout human history. This means that two categories of people are susceptible to being labeled mentally ill: those who for one reason or another cannot abide by cultural norms and those who choose not to (Szasz, 1974; Vatz & Weinberg, 1983).

Early Explanations of Mental Illness

The proposed explanations of mental illness that have been offered throughout history fall into three general categories: biological, psychological, and supernatural.

Biological Explanations. Generally, biological explanations of abnormal behavior constitute the **medical model of mental illness**. This model assumes that all disease is caused by the malfunctioning of some aspect of the body, usually the brain. The bodily abnormalities causing mental illness can be inherited directly, as was supposed to be the case with "natural fools," or a predisposition toward mental illness could be inherited, which could then be activated by certain experiences. In

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one way or another, constitutional factors have almost always been suggested as possible causes of mental illness.

Also, included among the biological explanations of mental illness are the many events that can interfere with the normal functioning of the body. Such events include injuries; tumors and obstructions; ingestion of toxins; polluted air, water, or food; disease; excessive physical stress; and physiological imbalances such as those caused by improper diet.

Psychological Explanations. A **psychological model of mental illness** proposes that psychological events are the causes of abnormal behavior. Here, psychological experiences such as grief, anxiety, fear, disappointment, frustration, guilt, or conflict are emphasized. The stress that results from living in an organized society has always been recognized as a possible explanation of mental illness; how much psychological explanations were valued varied with time and place. As is the case today, biological and psychological explanations of mental illness most often existed simultaneously. Frequently, it was believed that psychological events influenced biological events, and vice versa. Nevertheless, tensions have arisen between those favoring the medical model of mental illness and those accepting the psychological model. We will say more about such tensions later.

Supernatural Explanations. In primitive times, people attributed most ailments not caused by obvious things—such as falling down, being attacked by an animal or an enemy, or drunkenness—to mysterious forces. People did not distinguish between mental and physical disorders but believed both to be inflicted on a person by some supernatural being. Such mystical explanations of all illness (including mental) prevailed until the time of the early Greek physicians, such as Alcmaeon and Hippocrates. The Greek naturalistic approach to medicine was highly influential until the collapse of the Roman Empire. From that time until about the 18th century, supernatural explanations of diseases again predominated.

Although the **supernatural model of mental illness** was popular during the Middle Ages, it would be a mistake to conclude that it was the only model:

> Although notions of demonology flourished in medieval religious, lay, and even medical speculation, rational and naturalistic theories and observations continued to be influential. This is evident in the historical, biographical, medical, legal, and creative literature of the times. Explanations of psychopathological behavior were not confined to demon possession; they embraced a diversity of ideas derived from common sense, classical medicine and philosophy, folklore and religion. In medieval descriptions of mental illness there is most typically an interweaving of statements variously implying natural (biological and psychological) and supernatural causation. It is difficult to … discern what was intended to be taken literally and what metaphorically. (Maher & Maher, 1985, p. 283)

Biological, psychological, and supernatural explanations of mental illness have almost always existed in one form or another; what has changed through history is how one type of explanation has been emphasized over the others.

EARLY APPROACHES TO THE TREATMENT OF MENTAL ILLNESS

Psychotherapy is an attempt to help a person with a mental disturbance. As mentioned earlier, common themes characterize behavior that is considered abnormal. Common themes also run through all forms of psychotherapy. Joseph Matarazzo, the 1989 APA President, explains:

> The common elements in both ancient and modern forms of psychotherapy are a sufferer, a helper, and a systematized ritual through which help is proffered. Although

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> the specific purposes in consulting a psychotherapist are as numerous and unique as the individuals who seek such help, the basic reasons have always been to obtain assistance in (1) removing, modifying or controlling anxiety, depression, alienation, and other distressing psychological states, (2) changing undesirable patterns of behavior such as timidity, over-aggressiveness, alcoholism, disturbed sexual relationships, and the like, or (3) promoting more positive personal growth and the development of greater meaning in one's life through more effective personal functioning … or other goals which will better allow expression of the individual's potential. (1985, p. 219)

Although it may be true that ideally all versions of psychotherapy address the needs of the "sufferer," it is also true that not all versions of psychotherapy have been equally successful in doing so. In addition, individuals with mental illness have often been treated or confined, not so much for their own benefit as for the benefit of the community:

> Throughout the course of history there is a constantly recurring list of therapies for mental illness, each related in one way or another to the symptoms of and/or the supposed causes of the pathology. Although ideally therapies are devised to effect cures, they are often merely palliative, intended to relieve symptoms…. Treatments in general have been undertaken to meet the patient's need, to meet the needs of the patient's family or friends or community to do something for or about the patient, to solve social problems presented by the patient's condition. Treatment therefore may not be primarily intended to be therapeutic. The patient may be placed under custodial care in order to protect the patient from his or her own self neglect or abuse or the consequences of poor judgment; to allow time for rest, freedom from responsibility, proper diet to effect improvement; to protect others from the violence, problems, embarrassment, or inconvenience caused by the patient—or all of the above. (Maher & Maher, 1985, p. 266)

In any case, if an honest effort was made to treat mental illness, the treatment used was determined largely by beliefs concerning its cause. If it was believed that mental illness was caused by psychological factors, those factors were addressed during the therapeutic process. If it was believed that supernatural or biological factors caused mental illness, the therapeutic process was conducted accordingly.

The Psychological Approach

When psychological factors such as fear, anxiety, frustration, guilt, or conflict were viewed as the causes of mental illness, treatment was aimed at those factors. Methods used throughout history to address such factors include having the individual re-live a traumatic experience in order to create a *catharsis* (purging the mind of disturbing emotions); having the person relax; offering support, reassurance, and love from authority figures or relevant others; analyzing dreams, thoughts, and motives; and attempting to teach the "sufferer" new and more effective skills to enable better coping with their problems.

Somewhere between the psychological and supernatural explanations of mental illness was the 18th-century belief in natural law. Generally, **natural law** is the belief that you get what you deserve in life:

> Philosophical ideas about human society were, in the eighteenth century, affected by the concept of "natural law." According to this view there were certain natural consequences to behavior such that actions long regarded as sinful, such as drinking, gambling, or whoring, naturally led to madness, disease, and poverty. The alcoholic with delirium tremens or the patient in the terminal stages of syphilis-induced

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> paresis could thus be seen as suffering an inevitable and natural outcome of their own behavior. On the other hand, wealth, health, and prosperity came from habits of industry, sobriety, and the like; the rewards were not to be seen as "prizes" given for good behavior, but as natural effects of this behavior. (Maher & Maher, 1985, p. 303)

The implications for psychotherapy are clear. To alleviate suffering, the patient must change his or her ways, and it is the therapist's job to help him or her to do so.

The Supernatural Approach

If it was believed that evil forces entering the body caused illness, then a cure would involve removing those forces. In attempting to coax the invading forces from an inflicted person's body, the primitive medicine man would use appeal, bribery, reverence, and intimidation—and sometimes exorcism, magical rituals, and incantations.

In his famous book *The Golden Bough* (1890/1963), Sir James Frazer (1854–1941) discussed **sympathetic magic**, which, for primitive humans, was extremely important in the explanation and treatment of ailments. Frazer distinguished between two types of sympathetic magic: homeopathic and contagious. **Homeopathic magic** was based on the principle of similarity. An example of homeopathic magic is the belief that what one did to a model or image of a person would affect that person. **Contagious magic**, which was based on the principle of contiguity, involved the belief that what was once close to or part of someone would continue to exert an influence on that person. For example, having a lock of hair that belonged to a person whose actions one was trying to control would increase the likelihood of success. Thus, if two things were similar or were at one time connected, they were thought to influence one another through sympathy. Using these principles, a medicine man would sometimes mimic a patient's symptoms and then model a recovery from them. Frazer (1890/1963) indicated that, to the individuals using them, these magical techniques must have appeared to be very effective:

> A ceremony intended to make the wind blow or the rain fall, or to work the death of an enemy, will always be followed, sooner or later, by the occurrence it is meant to bring to pass; and primitive man may be excused for regarding the occurrence as a direct result of the ceremony, and the best possible proof of its efficacy. Similarly, rites observed in the morning to help the sun to rise, and in the spring to wake the dreaming earth from her winter sleep, will invariably appear to be crowned with success.… (p. 68)

Primitive humans likely saw most illness as caused by evil forces or spirits entering the body. This view of illness was simply an extension of how primitive people viewed everything:

> Wind was destructive; hence he [the primitive human] assumed an angry being who blew it to attack him. Rain was sent by spirits to reward or punish him. Disease was an affliction sent by invisible superhuman beings or was the result of magic manipulations by his enemies. He animated the world around him by attributing to natural events the human motivations that he knew so well from his own subjective experiences. Thus it was logical to him to try to influence natural events by the same methods he used to influence human beings; incantation, prayer, threats, submission, bribery, punishment and atonement. (Alexander & Selesnick, 1966, p. 9)

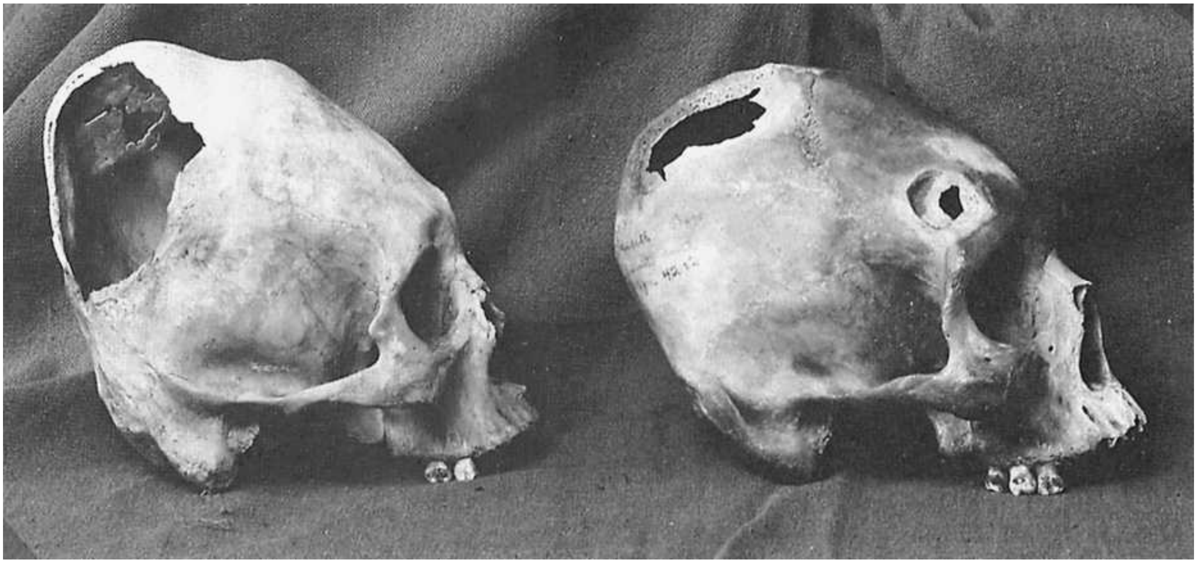
Bleeding a patient or removing a section of his or her skull were also widely used to allow evil spirits to escape from the body. Thousands of prehistoric human skulls have been found throughout the world with man-made openings in them. These skulls display an opening made by chipping away at it with a sharp stone, a procedure known as **trepanation**. The photograph that follows here shows two trepanned skulls. Concerning trepanation, Finger (1994) says, "The fact the holes often exhibit smooth margins and clear signs of healing provides convincing evidence that this sort of surgery was conducted on living subjects and was not just a sacrificial or funeral rite" (p. 4). Just why trepanation was performed on living people thousands of years ago is a matter of considerable speculation. One idea is that it was performed to relieve pressure from brain tumors. However, perhaps the most widely accepted belief concerning trepanation is that it was used to treat headaches, convulsions, and mental disorders. Finger says, "These disorders were likely to have been attributed to demons, and it is conceivable that the holes were made to provide the evil spirits with an easy way out" (p. 5).

The Biological Approach

As early as 3000 B.C., the Egyptians showed great proficiency in treating superficial wounds and setting fractures (Sigerist, 1951). Even for ailments with unknown causes, the Egyptians used "natural" treatments such as vapor baths, massage, and herbal remedies. They believed, however, that even the influence of these natural treatments, if there was one, was due to the treatments' effect on unseen spirits. Early Greeks, prior to physicians like Hippocrates, also believed that a god inflicted mental illness upon a person for impiety.

Hippocrates (ca. 460–377 B.C.) was among the first to liberate medicine and psychiatry from their magico-religious background. As we saw in Chapter 2, the Greeks, starting with Thales, began replacing mystical explanations with naturalistic explanations. Hippocrates applied the naturalistic outlook to the workings of the human body. In addition to believing that physical health was associated with a balance among the four humors of the body, the Hippocratics implicated the brain as a source of mental illness:

> Men ought to know that from the brain, and from the brain only arise our pleasures, joys, laughter and jests, as well as our sorrows, pains, griefs and tears. Through it, in particular, we think, see, hear, and distinguish the ugly from the beautiful, the bad from the good, the pleasant from the unpleasant.… It is the same thing which makes us mad or delirious, inspires us with dread and fear, whether by night or by day, brings sleeplessness, inopportune mistakes, aimless anxieties, absentmindedness,



Prehistoric skulls showing trepanation

Courtesy of the Penn Museum, image # 56220 Prehistoric skulls showing trepanation, from Puntillo, Peru

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> and acts that are contrary to habit. These things that we suffer all come from the brain, when it is not healthy, but becomes abnormally hot, cold, moist, or dry, or suffers any other unnatural affection to which it is not accustomed. (Jones, 1923, Vol. 2, p. 175)

It was the condition of the brain, then, that determined whether a person was mentally normal or abnormal. Because abnormalities developed when the brain was too hot, cold, dry, or moist, therapy involved providing those experiences that returned the brain to its normal state.

Besides arguing that all ailments had natural causes, claiming that nature healed, and prescribing treatments such as baths, fresh air, and proper diet, the Hippocratics identified several mental illnesses—for example, hysteria, the mental illness that was to become so important in Freud's work. *Hysteria* is a term that has been used to describe a wide variety of matters such as paralysis, loss of sensation, and disturbances of sight and hearing. The Hippocratics accepted the earlier Greek and Egyptian contention that hysteria is a uniquely female affliction. *Hystera* is the Greek word for "uterus," and it was believed that the symptoms of hysteria are caused by the uterus wandering to various parts of the body. Although later proven false, this view of hysteria represents the biological approach to explaining mental illness.

The naturalistic and humane treatment of patients lasted through the time of Galen (ca. A.D. 129–199), who perpetuated and extended the Hippocratic approach to medicine. Also, as we saw in Chapter 2, Galen expanded the Hippocratic theory of humors into one of the first theories of personality. As the Roman Empire waned, however, the humane and rational treatment of physical and mental disorders essentially declined with it.

The Return of the Supernatural Approach

When the Romans came to power, they adopted much of the Greek emphasis on knowledge and reason even though they were more concerned with practical matters such as law, technology, and the military than were the philosophical Greeks. With the fall of the Roman Empire came an almost complete regression to the nonrational thinking that had characterized the time before the Greek naturalists:

> The collapse of the Roman security system produced a general regression to belief in the magic, mysticism, and demonology from which, seven centuries before, men had been liberated through Greek genius.… The psychiatry of the Middle Ages can be scarcely distinguished from prescientific demonology, and mental treatment was synonymous with exorcism.… In medieval exorcism Christian mythology and prehistoric demonology found a quaint union. (Alexander & Selesnick, 1966, pp. 50, 52)

This emphasis on spiritual causes notwithstanding, hospitals scattered throughout Europe treated the old, the sick, and the poor. Evidence also suggests that in many cases, individuals who had mental illness were treated alongside those who were physically ill (Allderidge, 1979). Even with their belief in demons and exorcism, however, witch hunts were not common during the early Middle Ages (Kirsch, 1978).

Witch Hunts. Magic, sorcery, and witchcraft have been practiced since the dawn of human history. In Christian Europe, prior to about the middle of the 14th century, such activities were typically viewed as remnants of paganism and were discouraged with relatively mild sanctions and punishments. During this period, the existence of witches (those in consort with the devil) and witchcraft (the evil work performed by witches) were taken for granted by almost everyone in Europe, especially eastern Europe. Eventually, however, the church became so concerned with witches and their evil deeds that a wholesale, institutionalized persecution of them was begun. The result was a reign of terror that gripped Europe for about three centuries. According to

Zusne and Jones (1989), the European persecution of witches occurred mostly between 1450 and 1750, with its peak around 1600.

On December 9, 1484, Pope Innocent VIII issued a papal bull (an official document) that authorized the systematic persecution of witches. In his bull, the Pope authorized Heinrich Kramer and James Sprenger, both Dominican priests and professors of theology, to act as inquisitors in northern Germany. To guide their work, Kramer and Sprenger wrote *Malleus Maleficarum (The Witches' Hammer*, 1487/1971). The papal bull of 1484 appeared as the preface, giving the book great authority. Also included was a letter of endorsement signed by members of the theology faculty from the University of Cologne; this too added to the book's credibility. Indeed, the *Malleus* became an official manual of the Inquisition.

The *Malleus* begins by attempting to prove the existence of devils and their hosts, witches. The *Malleus* also indicates that if the authors' arguments do not convince the reader, he or she must be the victim of witchcraft or a heretic. The second part of the book describes how pacts with the devil are made and consummated, the various forms witchcraft can take, and how those suffering from witchcraft can be cured. In general, all disorders, both physical and mental, whose origins were not known (and that was most) were believed to have a supernatural origin; that is, they were assumed to be caused by witchcraft. The list of such disorders included loss of sensory or motor functions, sexual dysfunction (including impotence, sterility, lust, and prostitution), hallucinations, visions, mutism, apparitions, drunkenness, melancholy (depression), and somnambulism. Suggested treatments of the bewitched included exorcism, confession, prayer, repetition of holy scripture, visits to holy shrines, and participation in church ceremonies.

Much of the *Malleus* is concerned with sexual matters. It describes in detail how female witches (who were the vast majority) copulate with incubi (male demons) as well as how male witches copulate with succubi (female demons). Considerable attention is paid to how witches interfere with human procreation. Of special interest was how witches could make men's penises nonfunctional. It was generally believed that sinful individuals were much more susceptible to witchcraft than were individuals without sin, and abnormal behavior was generally taken as a sign of sinfulness. One of the most grievous sins was sexual lust, which invited demonic possession. Because, according to the authors, women have stronger carnal desires than men, they are much more likely to become witches or to be bewitched. Not surprisingly, the *Malleus* was consistently harsh on women.

The final section of the *Malleus* describes how witches are to be forced to confess, tried, and punished. If interrogation and mild punishment were unsuccessful in eliciting a confession, more extreme measures could be employed, such as the application of a red-hot iron or boiling water (Kramer & Sprenger, 1487/1971, p. 233). Eventually, most of the individuals convicted of being witches confessed to swearing allegiance to Satan, eating the flesh of infants, attending witches' sabbaths, or having sexual intercourse with the devil. The confessions, of course, reinforced the beliefs upon which the witch hunts were based.

Clark (1997) estimates that in Europe between 1450 and 1750 over 200,000 people were accused of witchcraft and 100,000 of them were executed. Of those executed, approximately 80% to 85% were women. It should be noted, however, that arriving at an accurate count of individuals executed is extremely difficult, if not impossible. In fact, evidence suggests that the numbers often given are greatly exaggerated. For example, Harris (1974) places the number of executions at about 500,000. In any case, as recently as 1692, 20 people were condemned as witches and sentenced to death in Salem, Massachusetts, and the last legal execution of a condemned witch occurred in Glarus, Switzerland, in 1782 (Trevor-Roper, 1967). The preoccupation with witches and witchcraft during the Renaissance and Reformation clearly illustrates how conceptions of mental illness vary with the Zeitgeist. In most places today, witch hunting itself would be perceived as reflecting mental illness.

During the Renaissance, when advances were being made on so many other fronts, witch hunting

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was widespread, and astrology, palmistry, and magic were extremely popular. As we have seen, individuals with mental illness were generally assumed to be bewitched, and they either roamed the streets or were locked up in "lunatic asylums." One such asylum was the St. Mary of Bethlehem Hospital in London. Established in 1247 as a priory, it was converted to a mental asylum in 1547 by order of Henry VIII. Coming to be known as Bedlam because of the Cockney pronunciation of *Bethlehem*, this institution was typical of such places at the time. Inmates were chained, beaten, fed only enough to remain alive, subjected to bloodletting, and put on public display for paying sight-seers.

IMPROVEMENT IN THE TREATMENT OF MENTAL ILLNESS

Even during the 16th century, when witch hunts and trials were very popular, a few courageous people argued that the "bewitched" were not possessed by demons, spirits, or the devil. They argued that the type of behavior the "bewitched" displayed was caused by emotional or physical disorders. For example, similar symptoms (hallucinations, delirious behavior, a sensation of being set on fire) could be observed in disorders known at the time, such as Saint Anthony's Fire—which we now call ergotism and know to be caused by a fungus found on rye (Spanos, 1978).

One such individual was the ill-tempered, flamboyant Swiss physician Philippus Paracelsus (1493–1541). Paracelsus argued that an understanding of nature should come from experience and not from the blind allegiance to ancient philosophy as was often exemplified by the Scholastics. He noted that herbal remedies employed by common people were often effective in curing disorders. Being an alchemist, he speculated that it was the chemical composition of such remedies that explained their effectiveness, and he performed empirical studies to determine which chemicals could cure specific ailments. Incidentally, in one of his many chemical experiments Paracelsus mixed sulfuric acid and alcohol, thus creating an early harmless anesthetic (Finger, 1994). Although Paracelsus rejected demonology, he did believe in a "universal spirit" that permeated nature. When people were in harmony with this spirit, they were healthy; when they were not, they were unhealthy. Paracelsus believed that things such as chemicals, magnets, and the alignments of heavenly bodies could influence one's harmony with nature and therefore one's health. As bizarre as these suggestions may seem, they leaned toward naturalistic explanations of mental disorders. One of Paracelsus's maxims was, "Keep sorcery out of medicine" (Webster, 1982, p. 80). Paracelsus denounced the cruel treatment of women brought before the Inquisition as witches, saying, "There are more superstitions in the Roman church than in all these women" (Ehrenwald, 1991, p. 195). If the term *spiritual* is replaced by *psychological*, the following statement by Paracelsus has a modern ring to it: "There are two kinds of diseases in all men: One of them material and one spiritual.… Against material diseases material remedies should be applied. Against spiritual diseases spiritual remedies" (Ehrenwald, 1991, pp. 195–196).

According to Alexander and Selesnick (1966), Paracelsus was not the first physician to argue against labeling individuals as witches. Not only did Cornelius Agrippa (1486–1535) argue against witch hunts, but he also saved at least one individual from the ordeal of a witch trial. In 1563 Agrippa's student Johann Weyer (1515–1588) published *The Deception of Demons*, in which he claimed that those labeled as witches or as bewitched were actually mentally disturbed people. Weyer's *Deception* was a carefully written, well-documented, step-by-step rebuttal of accepted practice. He referred to witch burning as "Godlessness" and condemned theologians, judges, and physicians for tolerating it. Weyer became known to his contemporaries as a crusader against witch hunting, and this was enough for him to be considered insane, or even a witch.

The view that "witches" were actually people with mental illness also found support from Reginald Scot (1538–1599), who wrote *Discovery of Witchcraft* (1584/1964), and from the Swiss psychiatrist Felix Plater (1536–1614). In his book

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Practice of Medicine, Plater outlined several different types of mental disorders, including consternation, foolishness, mania, delirium, hallucinations, convulsions, drunkenness, hypochondria, disturbance of sleep, and unusual dreams.

The arguments of such people were eventually effective. In 1682, for example, Louis XIV of France abolished the death penalty for witches. Likewise, an analysis of Shakespeare's works—which features many characters exhibiting psychiatric symptoms—has often been used to show the views of his time (for example, Bristow, 1988). Such analysis suggests that instead of demons, mental illness was seen as a matter of stress or inherent defect.

Although mental illness increasingly came to be viewed as having natural rather than supernatural causes, it was still poorly understood, and people with mental illness were treated badly—if treated at all. "Canst thou not minister to a mind diseased" asks Macbeth of the doctor, who replies "Therein the patient must minister to himself." In general, bloodletting was still the most popular way of treating all ailments, including mental disorders, and methods were devised for inducing shock in patients (a technique first employed by the Romans). One such method was to spin patients very rapidly in a chair; another was to throw several buckets of cold water on chained patients. Physicians would often report dramatic improvement in the condition of a patient following such treatments.

Philippe Pinel

Philippe Pinel (1745–1826) came from a family of physicians and received his medical degree in 1773 from the University of Toulouse. Upon beginning his practice, Pinel was so upset by the greed and insensitivity of his fellow physicians that he moved to Paris, where he concentrated on treating that city's poor. Pinel became interested in mental illness when a close friend became afflicted with a mental disorder and Pinel could not treat him. He read the existing literature on mental illness and consulted with the so-called experts, finding the information essentially worthless except for the work of Joseph Daquin (1733–1815). Daquin believed that mental illness was a natural phenomenon that should be studied and treated by the methods of natural science. Pinel and Daquin became close friends, and Daquin dedicated the second edition of his book *Philosophy of Madness* (1793) to Pinel.

Pinel began writing influential articles in which he argued for the humane treatment of people with mental disturbances. In 1793 he was appointed director of the Bicetre Asylum, which had been an institution for the insane since 1660. Upon touring the facility, Pinel found that most inmates were chained and guards patrolled the walls to prevent escape. Pinel asked for permission to release the prisoners from their chains, and although the authorities thought Pinel himself was insane for having such a wish, they reluctantly gave him permission. Pinel proceeded cautiously. Starting in 1793, he removed the chains from a small number of inmates and carefully observed the consequences.

The first inmate to be unchained was an English soldier who had once crushed a guard's skull with his chains and was considered to be a violent person. Once released from his chains, the man proved to be nonviolent, and he helped Pinel care for the other inmates. Two years later, the soldier was released from Bicetre. Pinel gradually removed more inmates from their constraints, improved rations, stopped bloodletting, and forbade all harsh treatment such as whirling an inmate in a chair. In his book *A Treatise on Insanity*, Pinel said of bloodletting, "The blood of maniacs is sometimes so lavishly spilled, and with so little discernment, as to render it doubtful whether the patient or his physician has the best claim to the appellation madman" (1801/1962, p. 251).

In addition to unchaining inmates and terminating bloodletting and harsh treatment, Pinel was responsible for many innovations in the treatment of mental illness. He segregated different types of patients, encouraged occupational therapy, favored bathing and mild purgatives as physical treatments, and argued effectively against the use of any form of punishment or exorcism. In addition, Pinel was the first to maintain precise case histories and statistics

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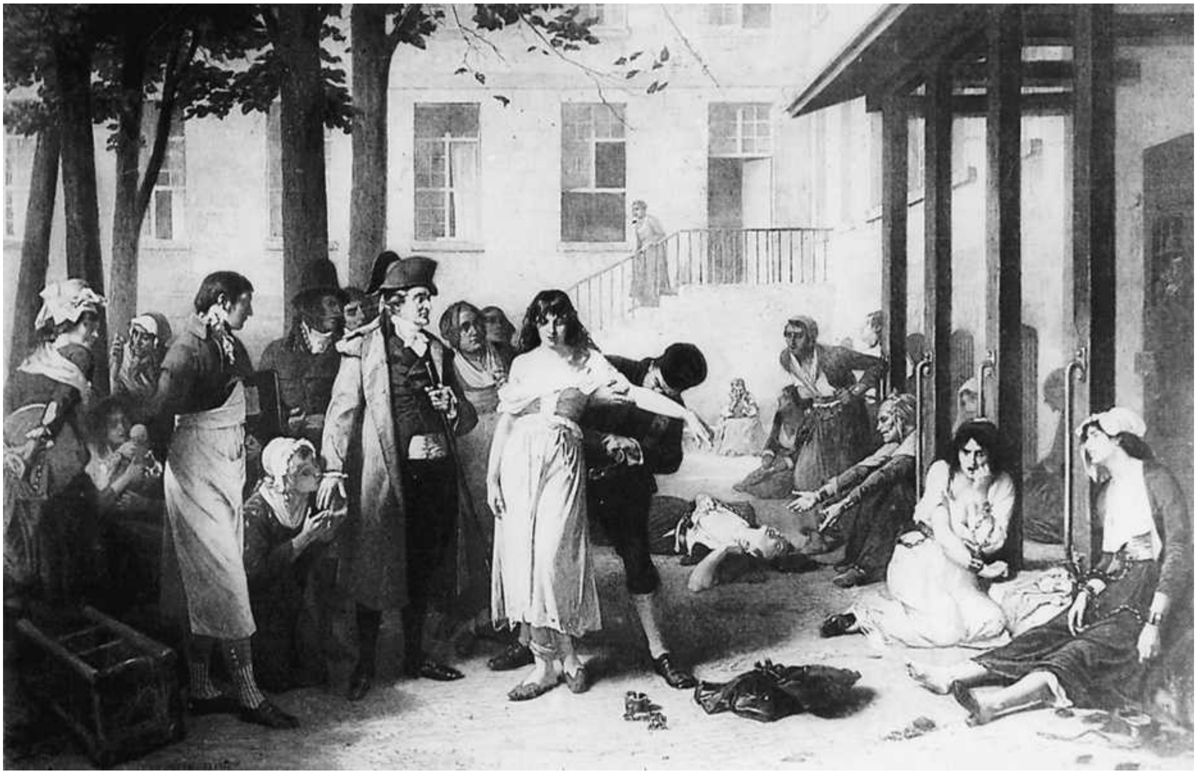

Pinel releasing the insane from their chains

© Courtesy of the National Library of Medicine

on his patients, including a careful record of cure rates.

Under Pinel's leadership, the number of inmate deaths decreased dramatically, and the number of inmates cured and released increased greatly. His success at Bicetre led to his 1795 appointment as director of La Salpetriere, the largest asylum in Europe, housing 8,000 insane women. Following the same procedures he had used at Bicetre, Pinel had equal success. When he died of pneumonia in 1826, he was given a hero's funeral attended by not only the most influential people in Europe but also hundreds of ordinary citizens, including many former patients from the Bicetre and La Salpetriere asylums.

Partially because of Pinel's success and partially because of the Zeitgeist, people throughout Europe and the United States began to argue for the humane treatment of the mentally disturbed. In Britain, William Tuke (1732–1822), a Quaker and a prosperous retired tea and coffee merchant with no medical training, visited a lunatic asylum and was horrified by what he saw. He dedicated the remaining 30 years of his life to improving the plight of those with mental illness, and in 1792 he founded the York Retreat. At the retreat, designed more like a farm than a prison, inmates were given good food, freedom, respect, medical treatment, recreation, and religious instruction. Tuke lived long enough to see his retreat become a model for institutions throughout the world. After his death, his son and then his grandson ran the retreat. His great grandson, Daniel Hack Tuke (1827–1895), was the first in the family to receive medical training, and he became a prominent psychiatrist during the Victorian period.

In 1788 Italian physician Vincenzo Chiarugi (1759–1820) was appointed superintendent of

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Ospidale di Bonifazio, a newly opened hospital for mental illness in Florence. Even before Pinel, Chiarugi had argued that those with mental illness should be spared physical restraint and harsh treatment. Like Pinel, he also provided work and recreational activities for his patients and recorded detailed case histories. Chiarugi's advice for dealing with mental illness has a ring of modern humanism (Chapter 17) to it:

> It is a supreme moral duty and medical obligation to respect the insane individual as a person. It is especially necessary for the person who treats the mental patient to gain his confidence and trust. It is best, therefore, to be tactful and understanding and try to lead the patient to the truth and to instill reason into him little by little in a kindly way.… The attitude of doctors and nurses must be authoritative and impressive, but at the same time pleasant and adapted to the impaired mind of the patient.… Generally it is better to follow the patient's inclinations and give him as many comforts as is advisable from a medical and practical standpoint. (Mora, 1959, p. 431)

It is interesting to note that although both Pinel and Chiarugi argued forcefully for the humane treatment of the mentally ill, their work was guided by different conceptions of mental illness. Pinel's work was guided primarily by the psychological model of mental illness, and Chiarugi's work was guided primarily by the medical model (Gerard, 1997).

Benjamin Rush

Benjamin Rush (1745–1813) had among his friends Thomas Jefferson and John Adams, and he served as surgeon general of the army under George Washington. As a member of the Continental Congress, he was one of the original signers of the Declaration of Independence. Rush had many strong convictions: he argued for the abolition of slavery; he opposed capital punishment, public humiliation of offenders, and the inhumane treatment of prisoners; he advocated for the education of women; and he argued for a greater emphasis on practical information in school curricula.

In 1812 Rush, who is often referred to as the first U.S. psychiatrist, wrote *Medical Inquiries and Observations Upon the Diseases of the Mind*, in which he lamented that people with mental illness were often treated like criminals or "beasts of prey." Instead, he urged that they should experience fresh air and sunlight and be allowed to go for walks within their institution. Furthermore, Rush contended, they should never be on display to the public for the purposes of vulgar curiosity and amusement. Despite his many enlightened views, Rush still advocated bloodletting and the use of rotating and tranquilizing chairs. He believed that bloodletting relieved vascular congestion, that rotating relieved the patient's congested brain, and that strapping a patient's arms and legs in a so-called tranquilizing chair calmed the patient.

Dorothea Lynde Dix

Also in the United States, **Dorothea Lynde Dix (1802–1887)** in 1841 began a campaign to improve the conditions of the mentally ill. Unhappy home circumstances had forced Dix to leave her family before her teen years, and just a few years later she began her own career as a schoolteacher. Later, illness caused her to give up her full-time teaching position and take a job instructing female inmates in a Boston prison. It became clear to Dix that many of the women labeled and confined as criminals actually had mental illnesses, and so Dix began her 40-year campaign to improve the plight of those with mental illness, traveling from state to state and pointing out their inhumane treatment. Within a three-year period, Dix visited 18 states and brought about institutional reforms in most of them.

During the Civil War, Dix served as the Union's superintendent of female nurses; after the war, she toured Europe seeking better treatment of people with mental illness. While in Europe, Dix visited with Queen Victoria and Pope Pius IX, convincing both that these patients were in dire need of better facilities and treatment. For more details concerning the life and work of Dix, see Viney (1996).

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Dorothea Lynde Dix

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As a result of the efforts of such individuals as Pinel, Tuke, Chiarugi, Rush, and Dix, patients with mental illness began to receive better treatment. However, this improved treatment typically involved only the patients' physical surroundings and maintenance. Alexander and Selesnick (1966) speculate that there were three reasons for the patients' poor treatment, even *after* it was no longer believed that they were possessed by demons. The reasons were ignorance of the nature of mental illness, fear of those with mental illness, and the widespread belief that mental illness was incurable. The work of such individuals as Kraepelin, Witmer, and the early hypnotists dramatically improved the understanding and treatment of mental illness.

Emil Kraepelin

Emil Kraepelin (1856–1926), a German psychiatrist who did postdoctoral research with Wundt, attempted to do for mental disorders what Wundt and his colleagues had done for sensations—classify them. In 1883 Kraepelin published a list of mental disorders that was so thorough it was adopted the world over and has lasted until recent times. He based his classification of mental diseases on what caused them, how much they involved the brain and nervous system, their symptoms, and their treatment. Some categories of mental disorders that Kraepelin listed, such as mania and depression, had been first mentioned by Hippocrates 2,300 years earlier. Some other categories of mental illness Kraepelin listed were dementia praecox, characterized by withdrawal from reality, excessive daydreaming, and inappropriate emotional responses; paranoia, characterized by delusions of grandeur or of persecution; manic depression, characterized by cycles of intense emotional outbursts and passive states of depression; and neurosis, characterized by relatively mild mental and emotional disorders. Kraepelin's friend, neurologist Alois Alzheimer (1864–1915), observed that a general loss of memory, reasoning ability, and comprehension sometimes accompanies old age. It was Kraepelin who dubbed this condition Alzheimer's disease. Kraepelin believed that most major mental illnesses, such as dementia praecox, are incurable because they are caused by constitutional factors. When the Swiss psychiatrist Eugen Bleuler (1857–1939) found that dementia praecox could be successfully treated, he changed the name of the disease to schizophrenia, which literally means "a splitting of the personality."

The list of categories of mental illness that many clinicians, psychoanalysts, and psychiatrists currently use as a guide is found in *The Diagnostic and Statistical Manual of Mental Disorders*, published by the American Psychiatric Association. This manual, referred to simply as DSM, is a direct descendant of Kraepelin's earlier work. Although Kraepelin's classifications clearly brought order to an otherwise chaotic mass of clinical observations, people did not always fall neatly into the categories that he created, nor were the causes for their disorders always physical in nature, as Kraepelin assumed. Still, Kraepelin went a long way toward standardizing the categories of mental illness and thus making communication about them more precise.

Kraepelin and Psychopharmacology. The use of psychoactive drugs has a long history. For example, the benefits of using such drugs as alcohol, opium, and hemp were recorded by ancient

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Emil Kraepelin

Egyptian, Greek, Roman, Babylonian, Chinese, Hindu, and Arabic physicians. Although most such reports are concerned with the medicinal properties of drugs, there are also reports of using drugs to gain access to spiritual entities or enlightenment. Perhaps less known is that Kraepelin was among the first, if not the first, to *systematically* study the effects of drugs on various cognitive and behavioral functions. In the early 1880s, while studying in Wundt's laboratory, he studied the effects of "poisons," such as alcohol, on various mental functions. Upon leaving Leipzig to take his academic post at Dorpat, he and his assistants continued to study what, in 1892, Kraepelin called *pharmacopsychology*. The effects of alcohol, morphine, caffeine, and other drugs on such intellectual tasks as comprehension, association, and memory were quantified as were their effects on such behavioral tasks as writing and speech. According to Schmied, Steinberg, and Sykes (2006), Kraepelin was an important pioneer in the field now known as psychopharmacology.

Lightner Witmer

Lightner Witmer (1867–1956) earned his doctorate under Wundt. He was born into a prominent Philadelphia family, and earned his bachelor's degree from the University of Pennsylvania in 1888 before taking a position teaching history and English at Rugby Academy, a secondary school in Philadelphia. He remained there for two years while taking classes in law and political science at the University of Pennsylvania. After a class from James McKeen Cattell, Witmer resigned his position at Rugby and entered graduate school. Cattell put Witmer to work studying individual differences in reaction times. He intended to earn his doctorate under Cattell, but when Cattell moved to Columbia, Witmer went to Leipzig for his advanced degree. Witmer's training at Leipzig coincided with Titchener's.

In the fall of 1892, Witmer returned from Europe to a faculty position at the University of Pennsylvania, where he taught courses and conducted research as an experimental psychologist in the Wundtian tradition. He remained at Pennsylvania for 45 years. The APA was also founded in 1892, and Witmer was a charter member, along with such individuals as William James, G. Stanley Hall, and James McKeen Cattell. In 1894 the university created special courses for public school teachers, and Witmer became involved in those courses. One teacher's description of the problem a student was having learning to spell strengthened Witmer's developing belief that psychology should provide practical information. The student was a 14-year-old boy who had what would probably be diagnosed today as dyslexia. Witmer decided to work with the student, and this marked the beginning of his career as a clinical psychologist. Soon he offered a special course on how to work with students who were "mentally defective, blind, or criminally disturbed" (McReynolds, 1987, p. 851).

In 1896 Witmer published an article titled "Practical Work in Psychology," and in 1897 he delivered a paper at an APA convention in Boston on the same topic in which he first employed the term *psychological clinic*. In 1896 Witmer founded the first psychological clinic at the University of Pennsylvania, only 17 years after the establishment of Wundt's experimental laboratory. In 1907 Witmer launched the *Psychological Clinic* journal, which was instrumental in promoting and defining the profession of clinical psychology. The journal continued publication until 1935. To Witmer and others, a

Lightner Witmer

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new profession was clearly emerging, and it needed to have a name. In the opening article of the first issue of his journal, Witmer named the profession **clinical psychology** and described the new vocation as follows:

> Although clinical psychology is clearly related to medicine, it is quite as closely related to sociology and to pedagogy.… An abundance of material for scientific study fails to be utilized, because the interest of psychologists is elsewhere engaged, and those in constant touch with the actual phenomena do not possess the training necessary to make the experience and observation of scientific value.… While the field of clinical psychology is to some extent occupied by the physician, especially by the psychiatrist, and while I expect to rely in a great measure upon the educator and social worker for the more important contributions to this branch of psychology, it is nevertheless true that none of these has quite the training necessary for this kind of work. For that matter, neither has the psychologist, unless he had acquired this training from sources other than the usual course of instruction in psychology.… The phraseology of "clinical psychology" and "psychological clinic" will doubtless strike many as an odd juxtaposition of terms relating to quite disparate subjects.… I have borrowed the word "clinical" from medicine, because it is the best term I can find to indicate the character of the method which I deem necessary for this work.… The methods of clinical psychology are necessarily involved wherever the status of an individual mind is determined by observation and experiment, and pedagogical treatment applied to effect a change, i.e., the development of such individual mind. Whether the subject be a child or an adult, the examination and treatment may be conducted and their results expressed in the terms of the clinical method. (McReynolds, 1987, p. 852)

In 1908 Witmer established a residential school for the care and treatment of retarded and troubled children. This was the first of several such schools that he founded. In this same year, Witmer began publishing articles that were highly critical of what he viewed as unscientific, or even fraudulent, ways of treating mental illness.

McReynolds argues that Witmer should be considered the founder or "father" of clinical psychology, but he recognizes that others may argue that Freud, Binet, or others should be given that honor. McReynolds (1987) makes his case for Witmer as follows:

> Witmer's role in the formation of clinical psychology is somewhat analogous to that of Wundt in experimental psychology, in that in each case the individual deliberately and self-consciously defined the existence of a new area and nurtured its early development, but other, later workers were responsible for giving the area greater depth and new directions. In Witmer's case the designation of founder is based primarily on the following six pioneering achievements:
>
> 1. He was the first to enunciate the idea that the emerging scientific psychology could be the basis of a new helping profession.

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> 2. He established and developed the first facility to implement this idea—a "psychological clinic," headed by a psychologist and primarily staffed by psychologists.
> 3. He proposed the term *clinical psychology* for the new profession and outlined its original agenda.
> 4. He conceptualized, organized, and carried out the first program to train clinical psychologists in the sense he defined.
> 5. Through his founding and long-time editorship of a journal (*The Psychological Clinic*) specifically intended to be the organ of the new profession, he further defined the area, publicized it, and attracted young persons to it.
> 6. Through his own activities in performing the kinds of professional activities that he envisaged for clinical psychologists, he served as a role model for early members. (pp. 855–856)

Although we have concentrated on Witmer's contributions to clinical psychology, he also made significant contributions to school psychology and special education (see, for example, Fagan, 1992, 1996; McReynolds, 1996, 1997). As far as clinical psychology is concerned, however, Witmer made three lasting impressions:

> (a) the idea that scientific psychology, in its rigorous experimental sense, can, if appropriately utilized, be useful in helping people; (b) the conception that this help can best be provided through the instrument of a special profession (clinical psychology) that is independent of both medicine and education; and (c) a commitment to the view that clinical psychology should itself be highly research oriented and should be closely allied with basic psychology. (McReynolds, 1987, p. 857)

It is important to note that Witmer was trained as an experimental psychologist and never wavered in his belief that clinicians should receive rigorous training in scientific methodology, the type of training leading to the Doctor of Philosophy degree (PhD). This tradition of the clinician as a scientist-practitioner was formally affirmed by the APA in 1949. Still, in 1973 the APA decided that the intense scientific training characteristic of the PhD program is not necessary for all clinical psychologists and established the Doctor of Psychology degree (PsyD) for those seeking training that emphasizes professional applications rather than research. In Chapter 20, we discuss the current debate over whether clinicians should be PhDs or PsyDs, but as far as Witmer was concerned, clinicians should be scientists—scientists who apply their knowledge to helping troubled individuals.

TENSIONS BETWEEN PSYCHOLOGICAL AND MEDICAL MODELS

As natural science succeeded, people applied its principles to everything, including humans. When applied to humans, mechanism, determinism, and positivism involved the search for a natural cause for all behavior, including abnormal behavior. After 2,000 plus years, conditions had returned to almost the point where they had been about the time of Hippocrates; once again people were emphasizing the brain as the seat of the intellect and the emotions.

This return to naturalism was both good and bad for psychology. It was good because it discouraged mysticism and superstition. No longer did people use evil demons, spirits, or supernatural forces to explain mental illness. On the negative side, it discouraged a search for the *psychological factors* underlying mental illness, for it suggested that a search for such factors was a return toward demonology. By the mid-19th century, the dominant belief was that the cause of all illness, including mental illness, was disordered physiology or brain chemistry. This belief retarded the search for psychological causes of mental illness, such as conflict, frustration, emotional disturbance, or other cognitive factors. Under the medical model of mental illness, psychological explanations of mental illness were suspect.

The debate still exists between those who seek to explain all human behavior in terms of physiology or biochemistry (those following a medical model) and those who stress the importance of mental variables such as anxiety, fear, and unconscious motivation (those following a psychological model). This debate is illustrated in the explanations currently offered for alcoholism. Those individuals accepting the medical model claim that alcoholism is a disease that either is inherited (perhaps only as a predisposition) or results from a biochemical imbalance, a metabolic abnormality, or some other biological condition. Those individuals accepting the psychological model are more likely to emphasize the alcoholic's life circumstances in their explanation—circumstances that cause the stress, frustration, conflict, or anxiety from which the alcoholic is presumably attempting to escape.

Some believe that unless an illness has a neurophysiological basis, it is not an illness at all. That is, it is possible for a brain to be diseased and cause various behavior disorders, but in such a case there is no "mental" illness, only an actual *physical* disease or dysfunction. For example, in his influential book *The Myth of Mental Illness* (1974), **Thomas Szasz** (1920–2012), himself a psychiatrist, contends that what has been and is labeled mental illness reflects problems in living or nonconformity but not true illness. Therefore, according to Szasz, the diagnosis of mental illness reflects a social, political, or moral judgment, not a medical one. Of course, problems in living are very real and can be devastating enough to require professional help. According to Szasz, psychiatry and clinical psychology are worthy professions if they view those whom they help as clients rather than patients and have as their goal helping people to learn about themselves, others, and life. They are invalid, or "pseudosciences," if they view their goal as helping patients recover from mental illness.

Szasz argues that the belief that mental illness is a real illness has hurt many more people than it has helped. For one thing, he says, to label problems in living as an illness or as a disease implies that a person is not responsible for solving those problems, that they are circumstances beyond his or her control. Furthermore, Szasz and others argue that labeling a person as having a particular mental illness may encourage him or her to think and act in ways dictated by the diagnosis:

Thomas Szasz

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> Such labels, conferred by mental health professionals, are as influential on the patient as they are on his relatives and friends, and it should not surprise anyone that the diagnosis acts on all of them as a self-fulfilling prophesy. Eventually, the patient himself accepts the diagnosis, with all of its surplus meanings and expectations, and behaves accordingly. (Rosenhan, 1973, p. 254)

As we will see in the next chapter, Freud received his medical training within the positivistic tradition of Helmholtz, and he first attempted to explain personality in terms of the medical model. Frustrated, however, he soon was forced to switch to the psychological model. It was, to a large extent, the work of the early hypnotists that caused Freud to change his mind, and it is to that work that we turn next.

THE USE OF HYPNOTISM

Franz Anton Mesmer

It is ironic that the road away from mysticism and toward a better understanding of mental illness includes the efforts of **Franz Anton Mesmer**

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(1734–1815). Mesmer's work was eventually judged unscientific, but at one time his theory of animal magnetism was an improvement over the prevailing superstitions. Mesmer obtained his medical degree in 1766 from the University of Vienna. In his dissertation, which was titled "On the Influence of the Planets," he maintained that the planets influence humans through a force called *animal gravitation*. Considering Newton's theory of universal gravitation, this contention did not seem far-fetched.

In the early 1770s, Mesmer met a Jesuit priest named Maximilian Hell, who told Mesmer of cures he had accomplished using a magnet. This was not the first time magnets had been used to treat disorders. Paracelsus and others had used the same technique many years before. Mesmer himself then used a magnet to "cure" one of his patients when all conventional forms of treatment had failed. Next, Mesmer tried the magnetic treatment on other patients with equal success. It should be pointed out that the magnetic treatment always involved telling the patient exactly what was expected to occur.

With the success of his magnetic treatment, Mesmer had the information he needed to challenge one of the most famous exorcists of the late 18th century, an Austrian priest named Johann Gassner (1727–1779), who claimed to be curing patients by driving out their demons. Mesmer argued that Gassner's "cures" resulted from the rearrangement of "animal gravitation," not the removal of demons. In turn, Father Hell then claimed to be the first to have used **animal magnetism**. A great dispute followed, which was vividly covered by the newspapers of the day, and which Mesmer (probably unjustly) won.

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Franz Anton Mesmer

Mesmer assumed that each person's body contains a magnetic force field. In the healthy individual, this force field is distributed evenly throughout the body, but in the unhealthy individual it is unevenly distributed, causing physical symptoms. By using magnets, it was possible to redistribute the force field and restore the patient's health. Soon thereafter, Mesmer concluded that it was not necessary to use iron magnets because anything he touched became magnetized:

> Steel is not the only object which can absorb and emanate the magnetic force. On the contrary, paper, bread, wool, silk, leather, stone, glass, water, various metals, wood, dogs, human beings, everything that I touched became so magnetic that these objects exerted as great an influence on the sick as does a magnet itself.… I filled bottles with magnetic materials just as one does with electricity. (Goldsmith, 1934, p. 64)

Finally, Mesmer found that he did not need to use any object at all; simply holding his hand next to a patient's body was enough for the patient to be influenced by Mesmer's magnetic force. Mesmer concluded that although all humans contain a magnetic force field, in some people the field is much stronger than in others. These people are natural healers, and he, of course, was one of them.

In 1777 Mesmer agreed to treat Maria Theresa Paradies, a 17-year-old pianist who had been blind since the age of three. Mesmer claimed that his treatment returned her sight but that she could see only while alone in his presence. The medical community accused Mesmer of being a charlatan, and he was forced to leave Vienna. He fled to Paris where, almost immediately, he attracted an enthusiastic following. He was so popular that he decided

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to treat patients in groups rather than individually, and still he was effective. Patients would enter a thickly carpeted, dimly lit, fully mirrored room. Soft music played, and the air was filled with the fragrance of orange blossoms. The patients held iron rods that projected from a *baquet*, a tub filled with "magnetized" water. Into this scene stepped Mesmer, wearing a lilac cloak and waving a yellow wand. This entire ritual was designed to produce a "crisis" in his patients. During a crisis, a patient would typically scream, break into a cold sweat, and convulse. He noted that when one patient experienced a crisis, others would soon do so also. Thus, treating groups increased not only Mesmer's profits (although poor patients were not charged) but his effectiveness as well. Because of what was later called the **contagion effect**, many patients who would not respond to suggestion when alone with a physician would do so readily after seeing others respond. As was undoubtedly the case with exorcism and with faith healing, many of Mesmer's patients reported being cured of their ailments. In all these cases, the symptoms removed were probably hysterical—that is, of psychological origin. Exorcists, faith healers, and Mesmer all benefit from the fact that after experiencing an intense emotional episode, a patient's symptoms (especially if these symptoms are hysterical) often subside.

As Mesmer's fame grew and thousands came to his clinic, his critics became more severe. The French clergy accused Mesmer of being in consort with the devil, and the medical profession accused him of being a fraud. In response to the medical profession's criticisms, Mesmer proposed that 20 patients be chosen at random, 10 sent to him for treatment, and 10 sent to members of the French Academy of Medicine; the results would then be compared. Mesmer's interesting proposal was rejected. In 1781 Queen Marie Antoinette, one of Mesmer's many influential friends, offered Mesmer a chateau and a lifetime pension if he would disclose the secrets of his success. Mesmer turned down the offer.

Popularity alone did not satisfy Mesmer. What he desperately wanted was the acceptance of the medical profession, which saw him as a quack. In 1784 the Society of Harmony (a group dedicated to the promotion of animal magnetism) persuaded the king of France to establish a commission to objectively study the effects of animal magnetism. This truly high-level commission consisted of Benjamin Franklin (the commission's presiding officer); Antoine Lavoisier, the famous chemist; and Joseph Guillotin, the creator of a way to put condemned people to death in a "humane" manner—the guillotine. The commission conducted several experiments to test Mesmer's claims. In one experiment, a woman was told that she was being mesmerized by a mesmerist behind a door, and she went into a crisis although there was actually no one behind the door. In another experiment, a patient was offered five cups of water, one of which was mesmerized. She chose and drank a cup with plain water but experienced a crisis anyway.

Much to Mesmer's dismay, in its report of August 1784, the commission concluded that there was no such thing as animal magnetism and that any positive results from treatment supposedly employing it were due to the imagination. The commission branded Mesmer a mystic and a fanatic. Although many people, some of them prominent, urged Mesmer to continue his work and his writing, the commission's findings essentially destroyed him, and he sank into obscurity.

Although Mesmer faded away, mesmerism did not, especially in the United States. In January of 1836, Charles Poyen, a Parisian, strode upon the stage of Boston's Chauncey Hall to give the first of a series of lectures on animal magnetism. These lectures piqued the interest of members of the local intelligentsia, including Ralph Waldo Emerson, who embraced the topic enthusiastically. However, Emerson was not alone: "A cohort of Americans took to the practice enthusiastically, publishing materials, presenting lectures attended by thousands, conducting empirical investigations, and treating untold numbers of ill people" (Schmit, 2005, p. 403). The widespread popularity of mesmerism continued for about 20 years. Among the factors leading to its demise were Helmholtz's persuasive experiments that questioned the existence of vital substances, such as magnetism (see Chapter 8), and the discovery that trance could be induced without recourse to magnetism (see below). Nonetheless, "[The mesmerists] helped define the character of psychology for their generation, showing how it was applicable to people's lives and that it was a 'mental science' based on obtaining 'facts' from demonstrable 'experiments'" (Schmit, p. 422).

Marquis de Puysegur

Although the commission's report silenced Mesmer himself, other members of the Society of Harmony continued to use and modify Mesmer's techniques. One such member, the **Marquis de Puysegur (1751–1825)**, discovered that magnetizing did not need to involve the crisis that Mesmer's approach necessitated. Simply by placing a person in a peaceful, sleeplike trance, Puysegur could demonstrate a number of phenomena. Although the person appeared to be asleep, he or she would still respond to Puysegur's voice and follow his commands. When Puysegur instructed the magnetized patient to talk about a certain topic, perform various motor activities, or even dance to imagined music, he or she would do so and have no recollection of the events upon waking. Because a sleeplike trance replaced the crisis, Puysegur renamed the condition **artificial somnambulism**. He found that the therapeutic results of using this artificial sleep were as good as they had been with Mesmer's crisis approach.

With his new approach, Puysegur made many discoveries. In fact, he discovered most of the hypnotic phenomena known today. He learned that while in the somnambulistic state, individuals are highly suggestible. If they were told something was true, they acted as if it were true. Paralyses and various sensations, such as pain, could be moved around the body solely by suggestion. When individuals were told that a part of their body was anesthetized, they could tolerate normally painful stimuli such as burns and pin pricks without any sign of distress. Also, a wide variety of emotional expressions, such as laughing and crying, could be produced on command. It was observed that individuals could not remember what had occurred while in a trance, a phenomenon later called **posthypnotic amnesia**. What is now called **posthypnotic suggestion** was also observed. That is, while in a trance, an individual is told to perform some act such as scratching his or her nose when they hear their name. After being aroused from the trance, the individual will typically perform the act as instructed without any apparent knowledge of why he or she is doing so.

John Elliotson, James Esdaile, and James Braid

Because magnetizing a patient could, by suggestion, make him or her oblivious to pain, a few physicians began to look upon magnetism as a possible surgical anesthetic. John Elliotson (1791–1868) suggested that mesmerism be used during surgery, but the medical establishment forbade it even when other anesthetics were not available. In India however, James Esdaile (1808–1859), a surgeon with the British Army in Calcutta, performed more than 250 painless operations on Hindu convicts. His results were dismissed because his operations had been performed on natives and therefore had no relevance to England. About this time, anesthetic gases were discovered, and interest in magnetism as an anesthetic faded almost completely. The use of gases was much more compatible with the training of the physicians of the day than were the mysterious forces involved in magnetism or somnambulism.

James Braid (1795–1860), a prominent Scottish surgeon, was skeptical of magnetism, but after carefully examining a magnetized subject, he was convinced that many of the effects were real. Braid proceeded to examine the phenomenon systematically, and in 1843 he wrote *The Rationale of Nervous Sleep*. Braid explained magnetism in terms of prolonged concentration and the physical exhaustion that followed, stressing that the results are explained by the subject's suggestibility rather than by any power that the magnetizer possessed. He renamed the study of the phenomenon neurohypnology, which was then shortened to hypnosis (*hypnos* is the Greek word for "sleep"). Braid did as much as anyone to make the phenomenon previously known as magnetism, mesmerism, or somnambulism respectable within the medical community.

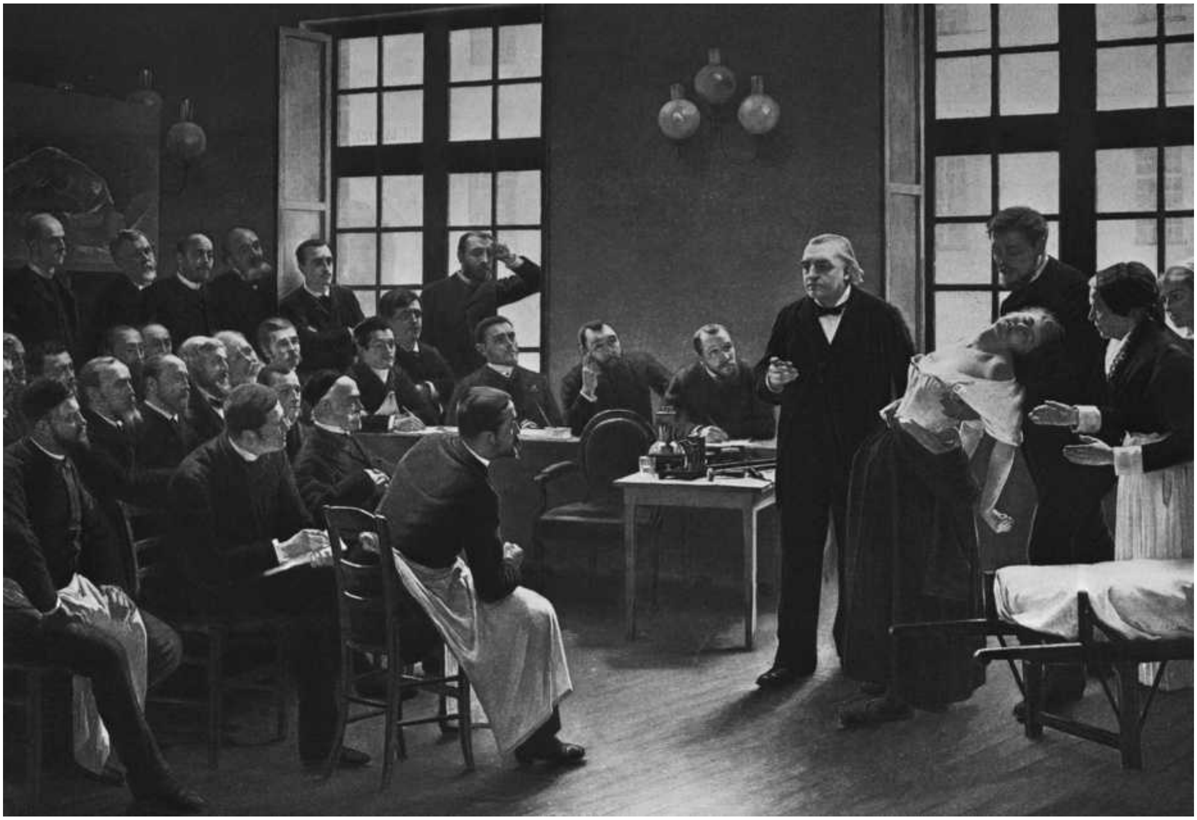
The Nancy School

Convinced of the value of hypnosis, **Auguste Ambroise Liebeault (1823–1904)** wanted to use it in his practice but could find no patient willing to be subjected to it. Eventually, he decided to provide free treatment to any patient willing to undergo hypnotism. A few patients agreed, and Liebeault was so successful that his practice was quickly threatened by an excess of nonpaying patients. Soon Liebeault was treating all his patients with hypnotism and accepting whatever fee they could afford. A "school" grew up around his work, and because he practiced in a French village just outside of the city of Nancy, it was called the **Nancy school**.

The school attracted a number of physicians; among them was **Hippolyte Bernheim (1840–1919)**, who became the major spokesperson of the Nancy school. Bernheim contended that *all* humans are suggestible but that some are more suggestible than others, and highly suggestible people are easier to hypnotize than those less suggestible. Furthermore, Bernheim found that whatever a highly suggestible patient believed would improve his or her symptoms usually did so.

Charcot's Explanation of Hypnosis and Hysteria

When **Jean-Martin Charcot (1825–1893)** became the director of La Salpetriere (the institution where Pinel had released the patients from their chains) in 1862, he immediately converted it into a research center. Though flamboyant, Charcot was considered one of the most brilliant physicians in



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Charcot demonstrating various hypnotic phenomena all of Europe. Space does not permit presenting a complete discussion of Charcot's impressive accomplishments as a neurologist, but a sample includes the following: He carefully observed his patients' symptoms, and upon their death he correlated those symptoms with specific abnormalities in the brain and spinal cord. He and his colleagues identified features of the spinal cord associated with poliomyelitis and multiple sclerosis. He described a disease of the motor neurons still referred to as Charcot's disease. He helped identify brain structures associated with a number of behavioral and physiological functions. And he instituted temperature taking as a daily hospital routine. Because of these and other accomplishments, Charcot's La Salpetriere became a place of pilgrimage for physicians from throughout the world; it became "the mecca of neurologists" (E. Jones, 1953, p. 207). Among those attending Charcot's lectures and demonstrations were Alfred Binet, William James, and Sigmund Freud, who studied with Charcot from October 13, 1885, to February 28, 1886.

Charcot's interests increasingly turned to hysteria, an ailment most physicians dismissed as malingering because they could find no organic cause for its symptoms. Charcot rejected the popular malingering theory and concluded that hysteric patients are suffering from a real disease. Staying within the medical model, however, he concluded that hysteria is caused by a hereditary neurological degeneration that is progressive and irreversible. Because both hysteria and hypnosis produce the same symptoms (such as paralyses and anesthesia), Charcot concluded that hypnotizability indicated the predisposition for hysteria. Charcot's belief that only those people suffering from hysteria could be hypnotized brought him into sharp conflict with members of the Nancy school—the former believing that hypnotizability is a sign of mental pathology, the latter believing that it is perfectly normal. The debate was heated and lasted for years. Toward the end of his life, Charcot admitted that his theory of suggestibility was wrong and that of the Nancy school was correct.

In his effort to explain hysteria and hypnotic phenomena, the otherwise positivistic Charcot noted that several of his patients had suffered a traumatic experience (such as an accident) prior to the onset of their symptoms, but that often the accidents were not severe enough to cause neurological damage. Charcot speculated that the accidents may have caused *ideas* that, in turn, caused the symptoms associated with hysteria. Among the more dramatic symptoms associated with hysteria are paralysis of various parts of the body and insensitivity to pain. Specifically, Charcot assumed that trauma had caused certain ideas to become dissociated from consciousness and, thus, isolated from the restrictions of rational thought. In this way, an idea caused by trauma "would be removed from every influence, be strengthened, and finally become powerful enough to realize itself objectively through paralysis" (Webster, 1995, p. 67). Contrary to the positivistic medicine that Charcot had previously accepted, he now speculated that hysterical symptoms (such as paralysis) had a psychological rather than an organic origin.

According to Charcot, the sequence of events from trauma to pathogenic ideas (ideas that produce physical symptoms) to the symptoms themselves could occur only in individuals who were inherently predisposed to hysteria. Also, as we have seen, Charcot believed for many years that only individuals predisposed to hysteria could be hypnotized. With hypnosis, the hypnotist's suggestions created the same "annihilation of the ego" as did traumatic experience. Thus, Charcot's explanation of hysteria and hypnotic phenomena combined biology (the inherited potential for hysteria) and psychology (the pathogenic ideas caused by trauma or suggestion). Uncharacteristically, Charcot accepted his speculations as fact: "No sooner had Charcot formulated this completely speculative solution to his two major scientific problems [hysteria and hypnosis] than he began to treat it as if it were an established scientific fact" (Webster, 1995, p. 67).

By coincidence, Freud was studying with Charcot just as Charcot was formulating the preceding theory. Freud accepted the theory uncritically and returned to Vienna believing that ideas could lodge in the unconscious portion of the mind where they could produce bodily symptoms:

> [Freud's] experience in Paris had … a profound effect on him and he returned not so much as a student reporting on a study-trip as a zealot who had undergone a religious conversion. The new gospel which

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> he brought with him was the idea that physical illnesses could have a purely psychological origin. (Webster, 1995, p. 100)

Pierre Janet (1859–1947) was Charcot's student, and he agreed with his mentor that for some individuals, aspects of the personality could become dissociated, or "split off," and these dissociated aspects of the personality could manifest themselves in hysteric symptoms or in hypnotic phenomena. Janet, like Charcot, speculated that both might result from the "subconscious" influence of dissociated aspects of personality. He noticed that the dissociated aspects of a patient's personality quite often consist of traumatic or unpleasant memories, and it was therefore the therapist's task to discover these memories and make the patient aware of them. Hypnosis was used to discover these dissociated memories, and when they were brought to the attention of a patient, his or her hysterical symptoms often abated.

As was the case with Charcot, we see much in Janet's work that anticipated Freud's. Even the names used to describe their methods were similar; Janet called his method psychological analysis, and Freud called his psychoanalysis. The ideas of Janet and Freud were so similar that there was a dispute between the two over priority (Watson, 1978).

It is important to note that the discussion of hypnosis featured in this chapter is not only of historical interest. Hypnosis continues even today to be used widely in therapy, and the nature of hypnosis continues to be debated within contemporary psychology. For a review of some more recent questions and controversies concerning hypnosis see, for example, Gauld, (1992) or Kirsch and Lynn (1995).

SUMMARY

Explanations of mental illness fall into three categories: biological explanations (the medical model), psychological explanations (the psychological model), and supernatural or magical explanations (the supernatural model). How mental illness was treated was largely determined by what its causes were assumed to be. All forms of psychotherapy, however, involved a sufferer, a helper, and some form of ritual. If the psychological model of mental illness was assumed, then treatment involved such things as the analysis of dreams, encouragement and support, or the teaching of more effective coping skills. Hippocrates was among the first to accept the biological model of illness (both physical and mental). He saw physical health resulting from a balance among the four humors of the body and illness resulting from an imbalance among them. He saw mental illness resulting primarily from abnormal conditions in the brain. To regain health, either physical or mental, the Hippocratics prescribed such naturalistic remedies as mineral baths, fresh air, and proper diets. The Hippocratics also identified a number of mental illnesses, including hysteria.

During the Middle Ages and the Renaissance, those with mental illness were often believed to be possessed by evil spirits and were harshly treated. But even during this dark time in history for those with mental illness, some people refused to believe that abnormal behavior resulted from possession of the person by demons, spirits, or the devil. Paracelsus, Agrippa, Weyer, Scot, and Plater argued effectively that abnormal behavior had natural causes and that people with mental illness should be treated humanely. Even when the supernatural explanation of mental illness subsided, however, patients were still treated harshly in "lunatic asylums" such as Bedlam. Not until the end of the 18th century did Pinel, Tuke, Chiarugi, Rush, Dix, and others help bring about dramatically better living conditions for people with mental illness. Through the efforts of these pioneers, many patients were unchained; given better food; provided recreation, fresh air, sunlight, and medical treatment; and treated with respect.

In 1883 Kraepelin summarized all categories of mental illness known at that time; he attempted to show the origins of the various disorders and how the disorders should be treated. Kraepelin also performed pioneering research in the field that came to be called psychopharmacology. One of the charter

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members of the APA, Lightner Witmer, was trained as a Wundtian experimental psychologist but became increasingly interested in using psychological principles to help people. He coined the term *clinical psychology*, established the world's first psychological clinic in 1896 (and subsequently several others), developed the first curriculum designed to train clinical psychologists, and founded the first journal devoted to the diagnosis and treatment of mental illness. By the mid-19th century, the medical model of illness (both physical and mental) had prevailed. The prevalence of the medical model discouraged a search for the psychological causes of mental illness because it was believed that such a search exemplified a return to a form of demonology. Although psychological explanations of mental illness became more respectable, there was and is a tension between those accepting the medical model and those accepting the psychological model. Szasz contends that mental illness is a myth because it has no organic basis. To him, what is called mental illness is more accurately described as problems in living, and individuals should have the responsibility for solving those problems rather than attributing them to some disease.

The work of Mesmer played a crucial role in the transition toward objective psychological explanations of mental illness. Mesmer believed that physical and mental disorders are caused by the uneven distribution of animal magnetism in the patient's body. He also believed that some people have stronger magnetic force fields than others and that they, like himself, are natural healers. Because of something later to be called the contagion effect, some of Mesmer's clients were more easily "cured" in a group than individually.

Puysegur discovered that placing clients in a sleeplike trance, which he called artificial somnambulism, was as effective as Mesmer's crisis-oriented approach for treating disorders. Puysegur explained this sleeplike state as the result of suggestibility. He also discovered the phenomena of posthypnotic suggestion and posthypnotic amnesia. By systematically studying hypnosis and attempting to explain it as a biological phenomenon, Braid gave it greater respectability in the medical community. Members of the Nancy school, such as Liebeault and Bernheim, believed that all humans are more or less suggestible and therefore hypnotizable; Charcot, in contrast, believed that only hysterics are hypnotizable. Unlike most other physicians of his day, Charcot treated hysteria as a real rather than an imagined illness. Charcot theorized that traumatic experiences cause ideas to become dissociated from consciousness and thus from rational consideration. In such isolation, the dissociated ideas became powerful enough to cause the bodily symptoms associated with hysteria. Charcot's ideas played a significant role in Freud's subsequent work. Like Charcot, Janet believed that aspects of the personality, such as traumatic memories, could become dissociated from the rest of the personality and that such dissociation explains both hysterical symptoms and hypnotic phenomena. Janet found that often when a patient became aware of and dealt with a dissociated memory, his or her hysterical symptoms would improve.

DISCUSSION QUESTIONS

1. What is mental illness? In your answer, include the criteria that have been used throughout history to define mental illness.
2. Summarize the medical, psychological, and supernatural models of mental illness and give an example of each.
3. Describe what therapy would be like if it were based on the psychological model of mental illness, on the supernatural model, and on the biological model.
4. Define and give an example of homeopathic and contagious magic.
5. How did Hippocrates define *health* and *illness*? What treatments did he prescribe for helping his patients regain health?
6. How did the publishing of the *Malleus Maleficarum* facilitate witch hunting? What were some of the signs taken as proof that a person was a witch or was bewitched? Why

was it assumed that women were more likely to be witches or bewitched than men?

7. In what ways did individuals such as Paracelsus, Agrippa, Weyer, Scot, and Plater improve the plight of the mentally ill?
8. What significance did Pinel have in the history of the treatment of the mentally ill? Rush? Dix?
9. What was the significance of Kraepelin's listing of the various mental disorders?
10. Summarize the reasons Witmer is considered the founder of clinical psychology.
11. Describe and give an example exemplifying the tension between explanations of mental illness based on the medical model and those based on the psychological model.
12. Why does Szasz refer to mental illness as a myth? Why does he feel that labeling someone as mentally ill may be doing him or her a disservice?
13. According to Mesmer, what causes mental and physical illness? What procedures did Mesmer use to cure such illnesses? What was Mesmer's fate?
14. What major phenomena did Puysegur observe during his research on artificial somnambulism?
15. Describe the debate that occurred between members of the Nancy school and Charcot and his colleagues over hypnotizability. Who finally won the debate?
16. Summarize the theory that Charcot proposed to explain hysteria and hypnotic phenomena.

SUGGESTIONS FOR FURTHER READING

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GLOSSARY

Animal magnetism A force that Mesmer and others believed is evenly distributed throughout the bodies of healthy people and unevenly distributed in the bodies of unhealthy people.

Artificial somnambulism The sleeplike trance that Puysegur created in his patients. It was later called a hypnotic trance.

Bernheim, Hippolyte (1840–1919) A member of the Nancy school of hypnotism who believed that anything a highly suggestible patient believed would improve his or her condition would do so.

Charcot, Jean-Martin (1825–1893) Unlike most of the physicians of his day, concluded that hysteria was a real disorder. He theorized the inherited predisposition toward hysteria could become actualized when traumatic experience or hypnotic suggestion causes an idea or a complex of ideas to become dissociated from consciousness. Isolated from rational control, such dissociated ideas become powerful enough to cause the symptoms associated with hysteria, for example, paralysis.

Clinical psychology The profession founded by Witmer, the purpose of which was to apply the principles derived from psychological research to the diagnosis and treatment of disturbed individuals.

Contagion effect The tendency for people to be more susceptible to suggestion when in a group than when alone.

Contagious magic A type of sympathetic magic. It involves the belief that what one does to something that a person once owned or that was close to a person will influence that person.

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Dix, Dorothea Lynde (1802–1887) Caused several states (and foreign countries) to reform their facilities for treating mental illness by making them more available to those needing them and more humane in their treatment.

Hippocrates (ca. 460–377 B.C.) Argued that all mental and physical disorders had natural causes and that treatment of such disorders should consist of such things as rest, proper diet, and exercise.

Homeopathic magic The type of sympathetic magic involving the belief that doing something to a likeness of a person will influence that person.

Janet, Pierre (1859–1947) Like Charcot, theorized that components of the personality, such as traumatic memories, could become dissociated from the rest of the personality and that these dissociated components are responsible for the symptoms of hysteria and for hypnotic phenomena.

Kraepelin, Emil (1856–1926) Published a list of categories of mental illness in 1883. Until recent times, many clinicians used this list to diagnose mental illness. Today the *Diagnostic and Statistical Manual of Mental Disorders* (2000) serves the same purpose. Kraepelin was also a pioneer in the field known today as psychopharmacology.

Liebeault, Auguste Ambroise (1823–1904) Founder of the Nancy school of hypnotism.

Medical model of mental illness The assumption that mental illness results from such biological causes as brain damage, impaired neural transmissions, or biochemical abnormalities.

Mental illness The condition that is said to exist when a person's emotions, thoughts, or behavior deviate substantially from what is considered to be normal at a certain time and place in history.

Mesmer, Franz Anton (1734–1815) Used what he thought were his strong magnetic powers to redistribute the magnetic fields of his patients, thus curing them of their ailments.

Nancy school A group of physicians who believed that because all humans are suggestible, all humans can be hypnotized.

Natural law The belief prevalent in the 18th century that undesirable or sinful behavior has negative consequences such as mental or physical disease or poverty, and virtuous behavior has positive consequences such as good health or prosperity.

Pinel, Philippe (1745–1826) Among the first, in modern times, to view people with mental illness as sick people rather than criminals, beasts, or possessed individuals. In the asylums of which he was in charge, Pinel ordered that patients be unchained and treated with kindness in a peaceful atmosphere. Pinel was also responsible for many innovations in the treatment and understanding of mental illness.

Posthypnotic amnesia The tendency for a person to forget what happens to him or her while under hypnosis.

Posthypnotic suggestion A suggestion that a person receives while under hypnosis and acts on when he or she is again in the waking state.

Psychological model of mental illness The assumption that mental illness results from such psychological causes as conflict, anxiety, faulty beliefs, frustration, or traumatic experience.

Psychotherapy Any attempt to help a person with a mental disturbance. What all versions of psychotherapy have had in common throughout history are a sufferer, a helper, and some form of ritualistic activity.

Puysegur, Marquis de (1751–1825) Found that placing patients in a sleeplike trance was as effective in alleviating ailments as was Mesmer's approach, which necessitated a crisis. He also discovered a number of basic hypnotic phenomena.

Rush, Benjamin (1745–1813) Often called the first U.S. psychiatrist. Rush advocated the humane treatment of people with mental illness but still clung to some earlier treatments, such as bloodletting and the use of rotating chairs.

Supernatural model of mental illness The assumption that mental illness is caused by malicious, spiritual entities entering the body or by the will of God.

Sympathetic magic The belief that by influencing things that are similar to a person or that were once close to that person, one can influence the person. (*See also* **Homeopathic magic** and **Contagious magic**.)

Szasz, Thomas (1920–2012) Psychiatrist best known for his book, *The Myth of Mental Illness*, which reconsiders how abnormality should be understood and treated in the current era.

Trepanation The technique of chipping or drilling holes in a person's skull, presumably used by primitive humans to allow evil spirits to escape.

Witmer, Lightner (1867–1956) Considered to be the founder of clinical psychology.

16

Psychoanalysis

When psychology became a science, it became first a science of conscious experience and later a science of behavior. Representatives of psychology's early schools—for example, Wundt, Titchener, and James—were aware of unconscious processes but focused on conscious experience. How then could a psychology that emphasized the unconscious mind emerge? The answer is that it did not come from academic or experimental psychology. Rather, it came from clinical practice. Those who developed the psychology of the unconscious were not concerned with experimental design or the philosophy of science; they were concerned with understanding the causes of mental illness.

By emphasizing the importance of unconscious processes as causes of mental illness, these early pioneers of psychoanalysis set themselves apart not only from the psychologists of the time but also from the medical profession of the day. A medical profession that had been strongly influenced by mechanistic-positivistic philosophy, according to which physical events caused all illness. If they used the term *mental illness* at all, it was as a descriptive term because they believed that all illnesses have physical origins.

The stressing of *psychological* causes of mental illness separated this small group of physicians from both their own profession and academic psychology. Theirs was not an easy struggle, but they persisted; in the end, they convinced the medical profession, academic psychology, and the public that unconscious processes must be taken into consideration in understanding why people act as they do. Sigmund Freud was the leader of this group of rebels, but before we examine his work, we consider some of the antecedents of his work.

ANTECEDENTS TO THE DEVELOPMENT OF PSYCHOANALYSIS

As we saw in the last chapter, both hypnotic phenomena and Charcot's proposed explanation of hysteria strongly influenced the development of Freud's theory, but there were other influences as well. In fact, a case can be made that all components of what was to become psychoanalysis existed before Freud began to formulate that doctrine. Some of those components were very much a part of the German culture in which Freud grew up, and others he learned as a medical student trained in the Helmholtzian tradition.

Leibniz (1646–1716), with his monadology, showed that depending on the number of monads involved, levels of awareness could range from clear perception (apperception) to experiences of which we are unaware (petites perceptions). Goethe (1749–1832) was one of Freud's favorite authors, and the major thrust of psychoanalysis was certainly compatible with Goethe's description of human existence as consisting of a constant struggle between conflicting emotions and tendencies. Hegel (1770–1831) also saw the resolution of conflicting forces (via the dialectic process) as a near ubiquitous explanation for human nature and achievement. Resonating with this Zeitgeist, Freud frequently focused on conflicts to explain his own ideas. Herbart (1776–1841) suggested that there is a threshold above which an idea is conscious and below which an idea is unconscious. He also postulated a conflict model of the mind because only ideas compatible with each other could occur in consciousness. If two incompatible ideas occur in consciousness, one of them is forced below the threshold into the unconscious. Herbart used the term *repression* to denote the inhibiting force that keeps an incompatible idea in the unconscious. As far as the notion of the unconscious is concerned, Boring said, "Leibniz foreshadowed the entire doctrine of the unconscious, but Herbart actually began it" (1950, p. 257).

Schopenhauer (1788–1860) believed that humans are governed more by irrational desires than by reason. Because the instincts determine behavior, humans continually vacillate between being in a state of need and being satisfied. Schopenhauer anticipated Freud's concept of sublimation when he said that we could attain some relief or escape from the irrational forces within us by immersing ourselves in music, poetry, or art. One could also attempt to counteract these irrational forces, especially the sex drive, by living a life of asceticism. Schopenhauer also spoke of repressing undesirable thoughts into the unconscious and of the resistance one encounters when attempting to recognize repressed ideas. Although Freud credited Schopenhauer as being the first to discover the processes of sublimation, repression, and resistance, Freud also claimed that he had discovered the same processes independently.

Friedrich Nietzsche (1844–1900)—and later, Freud—saw humans as engaged in a perpetual battle between their irrational (Dionysian) and rational (Apollonian) tendencies. According to Nietzsche, it is up to each person to create a unique blend of these tendencies within his or her own personality, even if doing so violates conventional morality. Indeed, concepts akin to the id and superego can be found in Nietzsche, suggesting that his influence upon Freud may have been greater than is commonly acknowledged (Greer, 2002; Kaufmann, 1974).

Like Herbart, Fechner (1801–1887) employed the concept of threshold in his work. More important to Freud, however, was that Fechner likened the mind to an iceberg, consciousness being the smallest part (about 1/10), or the tip, and the unconscious mind making up the rest. Besides borrowing the iceberg analogy of the mind from Fechner, Freud also followed Fechner in attempting to apply the recently discovered principle of the conservation of energy to living organisms. Freud said, "I was always open to the ideas of G. T. Fechner and have followed that thinker upon many important points" (E. Jones, 1953, p. 374).

By showing the continuity between humans and other animals, Darwin (1809–1882) strengthened Freud's contention that humans, like nonhuman animals, are motivated by instincts rather than by reason. According to Freud, it is our powerful animal instincts, such as our urges for sexual activity and willingness to be aggressive, that are the driving forces of personality, and it is these instincts that must be at least partially inhibited for civilization to exist.

Representing the positivistic approach to medicine and psychology, Helmholtz (1821–1894) tolerated no metaphysical speculation while studying living organisms, including humans. His approach, which permeated most of medicine and physiology at the time, initially had a profound effect on Freud. However, Freud eventually abandoned Helmholtz's materialism and switched from a medical (biological) to a psychological model in his effort to explain human behavior. Also important for Freud was Helmholtz's concept of the conservation of energy. Helmholtz demonstrated that an organism is an energy system that could be explained entirely on the basis of physical principles. Helmholtz demonstrated that the energy that comes out of an organism depends on the energy that goes into it; no life force is left over. Taking Helmholtz's idea of the conservation of energy and applying it to the mind, Freud assumed that only so much psychic energy is available at any given time and that it could be distributed in various ways. How this finite amount of energy is distributed in the mind accounts for all human behavior and thought.

Brentano (1838–1917) was one of Freud's teachers at the University of Vienna when Freud was in his early twenties. Brentano taught that motivational factors are extremely important in determining the flow of thought and that there are major differences between objective reality and subjective reality. This distinction was to play a vital role in Freud's theory. Under the influence of Brentano, Freud almost decided to give up medicine and pursue philosophy; but Ernst Brucke (1819–1892), the positivistic physiologist, influenced Freud even more than Brentano, and Freud stayed in medicine.

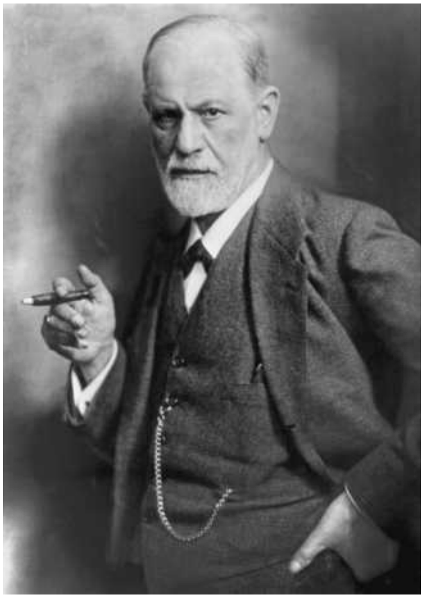
Karl Eduard von Hartmann (1842–1906) wrote a book titled *Philosophy of the Unconscious* (1869), which went through 11 editions in his lifetime. During the time that Freud was studying medicine and later when he was developing his theory, the idea of the unconscious was quite common in Europe, and no doubt every reasonably educated person was familiar with the concept. Hartmann was strongly influenced by both Schopenhauer's philosophy and Jewish mysticism. For him, there were three types of unconsciousness: processes that govern all natural phenomena in the universe; the physiological unconscious, which directs the bodily processes; and the psychological unconscious, which is the source of all behavior. Although Hartmann's position was primarily mystical, it had some elements in common with Freud's theory, especially the notion of the psychological unconscious (Capps, 1970).

Clearly then, the notions of an active, dynamic mind with a powerful unconscious component were very much part of Freud's philosophical heritage. As we will see, other aspects of Freud's theory—such as infantile sexuality, the emphasis on the psychological causes of mental illness, psychosexual stages of development, and even dream analysis—were also not original with Freud. Freud's genius was synthesizing—and then promoting—all these elements as a comprehensive theory of personality: "Much of what is credited to Freud was diffuse current lore, and his role was to crystallize these ideas and give them an original shape" (Ellenberger, 1970, p. 548).

SIGMUND FREUD

Sigmund Freud (1856–1939) was born on either March 6 or May 6 in Freiberg, Moravia (now Pribor, Czech Republic). His father, Jakob, was a wool merchant who had 10 children. Both his grandfather and his great-grandfather were rabbis. Freud considered himself a Jew all his life but had a negative attitude toward all organized religion. Jakob's first wife (Sally Kanner), whom he married when he was 17 years old, bore him two children (Emanuel and Philipp); his second wife apparently bore him none; and his third wife Amalie Nathansohn bore him eight children, of whom Sigmund was the first.

As for his birth date, Ernest Jones, Freud's official biographer, believed that the confusion between


adoc-photos/Corbis

Sigmund Freud

town records and family tradition reflected only a clerical error. Balmary (1979) contends that it was to conceal that Freud's mother was pregnant with Sigmund when she married Jakob. In any case, when Sigmund was born, his father was 40 years old and already a grandfather, and his mother was a youthful 20. Among the paradoxes that young Freud had to grapple with were the facts that he had half-brothers as old as his mother and a nephew older than he was. Sigmund was the oldest child in the immediate family, however, and clearly Amalie's favorite. Freud and his mother had a close, strong, and positive relationship, and he always felt that being the indisputable favorite child of his young mother had much to do with his success. Because his mother believed that he was special, he came to believe it too; therefore, much of what he accomplished later was due, he thought, to a type of self-fulfilling prophecy. Freud's father lived 81 years, and his mother lived until 1930, when she died at the age of 95.

When Jakob's business failed, the Freuds moved first to Leipzig and then, when Sigmund was age 4, to Vienna. From early on, Sigmund showed great intellectual ability; to aid his studies, he was given an oil lamp and a room of his own—the only one in the large household to have those things. His mother would often serve him his meals in his room, and she ordered a piano be taken away from one of his sisters because the music bothered him. Sigmund began reading Shakespeare when he was eight years old, and he deeply admired that author's power of expression and understanding of human nature all his life. Freud also had an amazing gift for languages. As a boy, he taught himself Latin, Greek, French, Spanish, Italian, and English, and later in life he became an acknowledged master of German prose (indeed, a nominee for the Nobel Prize in Literature, and winner of the Goethe Prize). He entered school a year earlier than normal and was always at the head of his class; at age 17, he graduated summa cum laude.

Until his final year of high school, Freud was attracted to a career in law or politics, or even in the military; but hearing a lecture on Goethe's essay on nature and reading Darwin's theory of evolution aroused his interest in science, and he decided to enroll in the medical school at the University of Vienna in the fall of 1873. He also made this decision partly because, in anti-Semitic Vienna, medicine and law were among the only academic professions open to Jews. Although Freud enrolled in medical school in 1873, it took him eight years to complete the program; because he had such wide interests, he was often diverted from his medical studies. For example, Brentano caused him to become interested in philosophy, and Freud even translated one of John Stuart Mill's books into German.

According to Freud's own account, the person who influenced him most during his medical studies was Ernst Brucke, who had, along with Helmholtz and Du Bois-Reymond, founded the materialistic-positivistic movement in physiology (see Chapter 8). In Brucke's laboratory, Freud studied the reproductive system of male eels and wrote a number of influential articles on anatomy and neurology. Freud obtained his medical degree in 1881 and continued to work in Brucke's laboratory. Even though doing physiological research was Freud's main interest, he realized that jobs in that area were scarce, low-paying, and generally not available to Jews. Freud's financial concerns

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became acute in 1882, when he became engaged to Martha Bernays. Circumstances and advice from Brucke caused Freud to change his career plans and seek a career in medical practice. To help prepare himself, Freud went to the Vienna General Hospital to study with Theodor Meynert (1833–1893), one of the best-known brain anatomists at the time, and Freud soon became a recognized expert at diagnosing various types of brain damage. Freud considered Meynert the most brilliant person he had ever known.

Many important events happened in Freud's life about this time. In addition to making the decision to practice medicine, Freud was making a name for himself as a neuroanatomist; he had just befriended Joseph Breuer (who, as we will see, introduced Freud to many of the phenomena that would occupy Freud's attention for the next 50 years), and he obtained the opportunity to study with Charcot in Paris. All these events were to have a significant influence on the development of Freud's career.

The Cocaine Episode

In the spring of 1884, Freud became interested in the study of cocaine after learning that it had been used successfully in the military to increase the energy and endurance of soldiers. Freud almost decided not to pursue his interest when he learned from the pharmaceutical company, Merck, that the price of 1 gram of cocaine was $1.27 instead of 13 cents as he had believed (E. Jones, 1953). Freud persisted, however, and after taking the drug himself, he found that it relieved his feelings of depression and cured his indigestion, helped him work, and appeared to have no negative side effects. Besides taking cocaine regularly himself, Freud gave it to his sisters, friends, colleagues, and patients and sent some to his fiancée Martha Bernays "to make her strong and give her cheeks a red color" (E. Jones, 1953, p. 81). The apparent improvement caused by cocaine in Freud's patients made him feel, for the first time, that he was a real physician. He became an enthusiastic advocate of cocaine and published six articles in the next two years describing its benefits.

Carl Koller (1857–1944), one of Freud's younger colleagues, learned from Freud that cocaine could also be used as an anesthetic. Koller was interested in ophthalmology and pursued Freud's observation as it related to eye operations. Within a few months, Koller delivered a paper describing how eye operations previously impossible could now, using cocaine as an anesthetic, be done with ease. The paper caused a sensation and brought Koller worldwide fame almost overnight. Freud deeply regretted having just missed gaining this professional recognition himself.

With the exception of the anesthetizing effects of cocaine, most all of Freud's other beliefs about the substance eventually proved to be false. In 1884 he administered cocaine to his colleague and friend Ernst von Fleischl-Marxow (1846–1891), who was addicted to morphine. Freud's intention was to switch Fleischl-Marxow, who was a prominent physicist and physiologist, from morphine to cocaine, believing the latter was harmless. Instead, he died a cocaine addict. Soon reports of cocaine addiction began coming in from throughout the world, and the drug came under heavy attack from the medical community. Although cocaine still has limited medical use today, it certainly didn't prove to be a viable career path.

Freud's Addiction to Nicotine. Although Freud avoided addiction to cocaine, he was addicted to nicotine most of his adult life, smoking an average of 20 cigars a day. At the age of 38, it was discovered that he had heart arrhythmia; his physician advised him to stop smoking, but he continued to do so. Being a physician himself, Freud was well aware of the health risks associated with smoking, and he tried several times to quit but without success. In 1923, when Freud was 67 years old, he developed cancer of the palate and jaw. A series of 33 operations eventually necessitated his wearing of an awkward prosthetic device (which he called "the monster") to replace the surgically removed sections of his jaw. He was in almost constant pain during the last 16 years of his life, yet he continued to smoke his cigars.

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EARLY INFLUENCES ON THE DEVELOPMENT OF PSYCHOANALYSIS

Josef Breuer and the Case of Anna O.

Shortly before Freud obtained his medical degree, he developed a friendship with **Josef Breuer (1842–1925)**, another one of Brucke's former students and the Brentano family's physician. Breuer was 14 years older than Freud and had a considerable reputation as a physician and researcher. Breuer had made an important discovery concerning the reflexes involved in breathing, and he was one of the first to show how the semicircular canals influenced balance. Breuer loaned Freud money, and after Freud married in April 1886, the Breuer and Freud families socialized frequently.

It is what Freud learned from Breuer concerning the treatment of a woman, anonymously referred to as Anna O., that essentially launched psychoanalysis. Because Breuer started treating Anna O. in 1880, while Freud was still a medical student, Freud (1910/1949) gave Breuer the credit for creating psychoanalysis:

> Granted that it is a merit to have created psychoanalysis, it is not my merit. I was a student, busy with the passing of my last examinations, when another physician of Vienna, Dr. [Josef] Breuer, made the first application of this method to the case of an hysterical girl (1880–82). (p. 1)

Anna O. was a bright, attractive, 21-year-old woman who had a variety of symptoms associated with hysteria. At one time or another, she had experienced paralysis of the arms or legs, disturbances of sight and speech, memory loss, and general mental disorientation. Breuer hypnotized the young woman and then asked her to recall the circumstances under which she first experienced a particular symptom. For example, one symptom was the perpetual squinting of her eyes. Through hypnosis, Breuer discovered that she had been required to keep a vigil by the bedside of her dying father. The woman's deep concern for her father had brought tears to her eyes so that when the weak man asked her what time it was she had to squint to see the hands of the clock.

Breuer discovered that each time he traced a symptom to its origin, which was usually some traumatic experience, the symptom disappeared either temporarily or permanently. One by one, Anna O.'s symptoms were relieved in this way. It was as if certain emotionally laden ideas could not be expressed directly but instead manifested themselves in physical symptoms. When such **pathogenic ideas** were given conscious expression, their energy dissipated, and the symptoms they initiated disappeared. Because relief followed the emotional release, Breuer called the treatment the **cathartic method**. Aristotle originally used the term *catharsis* (from the Greek *katharsis*, which means "to purify") to describe the emotional release and the feeling of purification that an audience experienced as they viewed a drama. Anna O. called the method the "talking cure." Breuer's treatment of Anna O. started in December 1880 and continued until June 1882. During that time, Breuer typically saw her several hours each day. Soon after treatment started, Anna O. began responding to Breuer as if he were her father, a process later called **transference**.

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Josef Breuer

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All emotions Anna had once expressed toward her father, both positive and negative, she now expressed toward Breuer. Breuer also began developing emotional feelings toward Anna, a process later called **countertransference**. Because of the excessive amount of time involved and because his emotional involvement in the case began to negatively impact his marriage and his other professional obligations, Breuer decided to terminate his treatment of Anna O.

The story of Anna O. usually ends with the revelation that Anna's real name was Bertha Pappenheim (1859–1936) and that Breuer's treatment must have been effective because the woman went on to become a prominent social worker in Germany. Ellenberger (1972), however, discovered that Anna O. was institutionalized after Breuer terminated her treatment. Little is known about her life between the time of her release from the sanatorium and her emergence as a social worker in the late 1880s. However, Pappenheim did eventually go on to become a leader in the European feminist movement; a playwright; an author of children's stories; a founder of several schools and clubs for the poor, the illegitimate, or wayward young women; and an effective spokesperson against white slavery. Her feminism is evident in the following statement she made in 1922: "If there is any justice in the next life women will make the laws there and men will bear the children" (E. Jones, 1953, p. 224). It is interesting to note that throughout her professional life she maintained a negative attitude toward psychoanalysis and would not allow any of the girls in her care to be psychoanalyzed (Edinger, 1968, p. 15).

Breuer and Freud published *Studies on Hysteria* (1895/1955), in which the case of Anna O. was the first presented, in 1895, and that date is usually taken as the date of the official founding of the school of psychoanalysis.

Freud's Visit with Charcot

As we saw in the last chapter, Freud studied with the illustrious Jean-Martin Charcot from October 1885 to February 1886. Until this visit, although Freud was aware of Breuer's work with Anna O., he remained a materialistic-positivistic physiologist; he sought to explain all disorders, including hysteria, only in terms of neurophysiology. As did most physicians at the time, Freud viewed *psychological* explanations of illness as nonscientific. As we have seen, Charcot assumed hysteria to be a real disease that could be triggered by dissociated ideas. Taking hysteria seriously and proposing a partially psychological explanation of the disease set Charcot apart from most of his colleagues. It is also significant for the subsequent development of psychoanalysis that Freud claimed to have overheard Charcot say about hysteria, "But in this kind of case it is always something genital—always, always, always" (Boring, 1950, p. 709). Furthermore, Charcot insisted that hysteria occurred in males as well as females. This contention caused a stir because from the time of the Romans it had been assumed that hysteria was caused by a disturbance of the uterus.

Freud returned to Vienna and, on October 15, 1886, presented a paper entitled "On Male Hysteria" to the Viennese Society of Physicians, in which he presented and endorsed Charcot's views on hysteria. The presentation was poorly received because, according to Freud, it was too radical. Sulloway (1979), however, indicates that the paper was poorly received not because it was shocking but because such views on hysteria, including the fact that hysteria was not a disorder confined to women, were already widely known within the medical community. According to Sulloway, Freud's account of the reaction to his paper on hysteria was perpetuated by his followers to enhance the image of Freud as a bold innovator fighting against the medical establishment.

In April 1886, Freud established a private practice as a neurologist in Vienna, and in September 1886, he finally married Martha Bernays after a four-year engagement. The Freuds eventually had six children—three boys and three girls. The youngest, Anna (1895–1982), went on to become a world-renowned child psychoanalyst and assumed leadership of the Freudian movement after her father's death. Freud soon learned that he could not make an adequate living treating only neurological disorders, and he made the fateful decision

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to treat hysterics, becoming one of the few Viennese physicians to do so. At first, he tried the traditional methods of treating neurological disorders—including baths, massage, electrotherapy, and rest cures—but found them ineffective. It was at this point that everything that he had learned from Breuer about the cathartic method and from Charcot about hypnosis became relevant.

In 1889 Freud visited the noted physicians Auguste Ambroise Liebeault and Hippolyte Bernheim at the Nancy school in hopes of improving his hypnotic skills. From Liebeault and Bernheim, Freud learned about *posthypnotic suggestion*, observing that an idea planted during hypnosis could influence a person's behavior even when the person was unaware of it. This observation—that intact ideas of which a person was unaware could play an important role in that person's behavior—confirmed what Freud had learned from Charcot and was to become an extremely important part of psychoanalysis. He also learned from Liebeault and Bernheim that although patients tend to forget what they had experienced during hypnosis (a phenomenon called *posthypnotic amnesia*), such memories could return if the patient is strongly encouraged to remember them. This observation, too, was important to the development of psychoanalysis.

The Birth of Free Association

Upon returning to his practice, Freud still found hypnosis to be ineffective and was seeking an alternative. Then he remembered that, while at the Nancy school, he had observed that the hypnotist would bring back the memory of what happened during hypnosis by putting his hand on the patient's forehead and saying, "Now you can remember." With this in mind, Freud tried having his patients lie on a couch, with their eyes closed, but not hypnotized. He asked the patients to recall the first time they had experienced a particular symptom, and the patients began to recollect various experiences but usually stopped short of the goal. In other words, as they approached the recollection of a traumatic experience, they displayed **resistance**. At this point, Freud placed his hand on the patient's forehead and declared that additional information was forthcoming, and in many cases it was. Freud found that this *pressure technique* was as effective as hypnosis, and soon he learned that he did not even need to touch his patients; simply encouraging them to speak freely about whatever came to their mind worked just as well. Thus, the method of **free association** was born.

With free association, the important phenomena of resistance, transference, and countertransference still occur but with the major advantage that the patient is conscious. Also, although when using free association it is often more difficult to arrive at the original traumatic experience, once attained it is available for the patient to deal with in a rational manner.

For Freud, the goals of psychotherapy are to help the patient overcome resistance and rationally ponder early traumatic experience. This is why he said that true psychoanalysis started only when hypnosis had been discarded (Heidbreder, 1933). Freud likened the use of free association to an archeologist's excavation of a buried city. It is from only a few fragmented artifacts that the structure and nature of a civilization must be ascertained. Similarly, free association provides only fragmented glimpses of the unconscious, and from those glimpses the psychoanalyst must determine the structure and nature of a person's unconscious mind.

During a therapeutic session Freud had his patients lie on a couch while he sat out of sight behind them. Freud gave two reasons for this arrangement: (1) It enhanced free association, for example, by preventing his facial expressions and mannerisms from influencing the flow of his patients' thoughts; and (2) he could not tolerate being stared at for eight, or more, hours a day (Storr, 1989).

Studies on Hysteria

In ***Studies on Hysteria*** (1895/1955), Breuer and Freud put forth a number of the basic tenets of psychoanalysis. They noted that hysteria is caused by a traumatic experience that is not allowed adequate expression and therefore manifests itself in physical symptoms. Therefore, symptoms could be taken as *symbolic representations* of an underlying traumatic experience that is no longer consciously available to the patient. Because such experience is traumatic, it is *repressed*—that is, actively held in the unconscious because to ponder it would provoke anxiety. Resistance, then, is a sign that the therapist is on the right track. **Repression** also often results from conflict, the tendency both to approach and to avoid something considered wrong.

The fundamental point is that repressed experiences or conflicts *do not go away*. Rather, they go on exerting a powerful influence on a person's personality. The only way to deal with repressed material properly is to make it conscious and thereby deal with it rationally. For Freud, the most effective way of making repressed material conscious is through free association. By carefully analyzing the content of free associations, gestures, and transference, the analyst could determine the nature of the repressed experience and help the patient become aware of it and deal with it. Thus, in *Studies on Hysteria*, Freud clearly outlined his belief in the importance of **unconscious motivation**. Freud and Breuer wrote separate conclusions to the book, and Freud emphasized the role of sex in unconscious motivation. At the time, Freud contended that a person with a normal sex life could not become neurotic.

PROJECT FOR A SCIENTIFIC PSYCHOLOGY

In 1895, the same year that Breuer and Freud published *Studies on Hysteria*, Freud completed *Project for a Scientific Psychology*. The purpose of *Project* was to explain psychological phenomena in purely neurophysical terms. In other words, he intended to apply the principles of Helmholtzian physiology, in which he was trained, to the study of the mind. Freud was not satisfied with his effort, and *Project* was not published (in his lifetime). Frustrated in his attempt to create a neurophysical (medical) model of the mind, Freud turned to a psychological model, and the development of psychoanalysis was truly begun.

The Seduction Theory

On April 21, 1896, Freud delivered a paper to the Psychiatric and Neurological Society in Vienna titled "The Aetiology of Hysteria." The paper stated that, without exception, Freud's hysteric patients related to him a childhood incident in which they had been sexually molested. Freud concluded that such an event was the basis of all hysteria. He stated his conclusion forcefully as follows:

> Whatever case and whatever symptom we take as our point of departure, *in the end we infallibly come to the field of sexual experience*. So here for the first time we seem to have discovered an aetiological precondition for hysterical symptoms. (Masson, 1984, p. 259)

Freud went on to say, "In all eighteen cases (cases of pure hysteria and of hysteria combined with obsessions, and comprising six men and twelve women) I have … come to learn of sexual experiences in childhood" (Masson, 1984, p. 268).

Richard von Krafft-Ebing (1840–1902), the illustrious physician and head of the department of psychiatry at the University of Vienna, chaired the meeting at which Freud's paper was presented. In a letter to his close friend Wilhelm Fliess (1858–1928), Freud described how his paper was received:

> A lecture on the aetiology of hysteria at the Psychiatric Society met with an icy reception from the asses, and from Krafft-Ebing the strange comment: It sounds like a scientific fairy tale. And this after one has demonstrated to them a solution to a more than thousand-year-old problem, a "source of the Nile"! They can all go to hell. (Masson, 1984, p. 9)

Masson (1984) suggests that the hostile reception by the medical community of Freud's paper was at least partially responsible for his subsequent abandonment of the **seduction theory**. Indeed, Freud abandoned his seduction theory in September 1897. In most cases, he concluded, the seduction had not really taken place. Rather, the patients had *imagined* the encounter. Freud decided that the imagined incidents were very real to his patients and therefore just as traumatic as if they had actually occurred. His original belief remained intact: The basis of neuroses was the repression of sexual thoughts, whether the thoughts were based on real or imagined experience.

Freud's Self-Analysis

Because of the many complexities involved in the therapeutic process, Freud soon realized that to be an effective analyst, he had to be psychoanalyzed himself. Freud (1927) insisted later that to be a qualified psychoanalyst one need not be a physician, but one does need to be psychoanalyzed. And, in addition to being psychoanalyzed, one needs at least several years of supervised practice as a psychoanalyst. Because no one was available to psychoanalyze Freud, he took on the job himself. Along with a variety of insecurities, such as an intense fear of train travel, a major motivation for Freud's self-analysis was his reaction to the death of his father in the fall of 1896. Although his father had been very ill and his death was no surprise, Freud found that his father's death affected him deeply. For months following the death, Freud experienced severe depression and could not work. His reaction was so acute that he decided he should regard himself as a patient.

Analysis of Dreams. Clearly, Freud could not use free association on himself, so he needed another vehicle for his self-analysis. He assumed that the content of dreams could be viewed in much the same way as hysterical symptoms. That is, both dreams and hysterical symptoms could be seen as symbolic manifestations of repressed traumatic thoughts. If one properly analyzed either the symbols of dreams or hysterical symptoms, one could get at the roots of the problem. **Dream analysis**, then, became a second way of tapping the unconscious mind (the first way being free association) and one that was suitable for Freud's self-analysis. Freud said, "The interpretation of dreams is the royal road to knowledge of the unconscious activities of the mind" (1900/1953, p. 608), and Freud's self-analysis culminated in what he considered to be his most important work, *The Interpretation of Dreams* (1900/1953).

Like the physical symptoms of hysteria, dreams require a knowledgeable interpretation. During sleep, a person's defenses are down but not eliminated, so a repressed experience reaches consciousness only in disguised form. Therefore, there is a major difference between what a dream appears to be about and what it really is about. What a dream appears to be about is its **manifest content**, and what it really is about is its **latent content**. Freud concluded that every dream is a **wish fulfillment**. That is, it is a symbolic expression of a wish that the dreamer could not express or satisfy directly without experiencing anxiety. Wishes expressed in symbolic form during sleep are disguised enough to allow the dreamer to continue sleeping because a direct expression of the wish involved would produce too much anxiety and disrupt sleep.

According to Freud, dream interpretation is complex business, and only someone well versed in psychoanalytic theory can accomplish the task. One has to understand the **dream work** that disguises the wish actually being expressed in the dream. Dream work includes **condensation**, in which one element of a dream symbolizes several things in waking life, such as when a family dog symbolizes an entire family. Dream work also involves **displacement**, in which, instead of dreaming about an anxiety-provoking object or event, the dreamer dreams of something symbolically similar to it, such as when one dreams of a cave instead of a vagina.

Freud believed that although the most important dream symbols come from a person's own experience, there also are universal dream symbols, which have the same meaning in everyone's dreams. For example, travel symbolizes our moving toward death; falling symbolizes giving in to sexual temptation; boxes, gardens, doors, or balconies symbolize the vagina; and cannons, snakes, trees, swords, church spires, and candles symbolize the penis.

Freud, Dreams, and Originality. In 1914 Freud said about dreams, "I do not know of any outside influence which drew my interest to them or inspired me with any helpful expectations" (1914/1966c, p. 18). He also said that, prior to his work, for a physician to suggest there was scientific value in the interpretation of dreams would have been "positively disgraceful," and such a physician would have been "excommunicated" from the medical community. All of this is Freudian myth.

The use of dream interpretation for diagnosing physical and mental disorders goes back at least to the early Greeks. In fact, as we saw in Chapter 2, Plato described dreams in a way reminiscent of Freud's later description. Rosemarie Sand (1992) indicates that, before Freud, some of the most prominent physicians in Europe were convinced of the scientific significance of dream interpretation: Among them Charcot, Janet, and Krafft-Ebing. These individuals suggested that often important information about a patient could be ascertained *only* through the interpretation of dreams. For example, Krafft-Ebing observed that some homosexuals dream of heterosexual relations and concluded that, for them, homosexuality was acquired and not congenital. Krafft-Ebing believed that, for such individuals, heterosexual tendencies are unconscious and disclosed only by dream analysis. In his personal library, Freud had four editions of the book by Krafft-Ebing describing how dreams could be used to explore the unconscious mind.

The Oedipus Complex

Freud's self-analysis did not result in any major theoretical breakthroughs, but it served to confirm many of the theoretical notions that he entertained before his self-analysis began.

> What, then, was the real scientific value of Freud's self-analysis? Self-analysis finally allowed him to confirm from his own experience just how remarkably widespread the opportunities were in every *normal* childhood for both traumatic and spontaneous sexual activity. At the same time, self-analysis enabled Freud to extend significantly his understanding of the various psychological correlates of such early sexual experiences. He was able to recall feelings of jealousy and hatred at the birth of a younger male sibling, one year his junior (and who died after only eight months of life). He also recognized love for the mother and jealousy of the father in the early years of his childhood and therefore concluded that such feelings must be a universal concomitant of this period of life.… He even recalled that "libido towards *matrem* was aroused" when, at the age of two, he had seen his mother in the nude. (Sulloway, 1979, p. 209)

Thus, by analyzing his own dreams, Freud confirmed his belief that young males tend to desire their mothers and be jealous of their fathers. He called this tendency the **Oedipus complex** after the Greek play *Oedipus Rex* by Sophocles, in which Oedipus killed his father and married his mother.

Because male children have a close physical relationship with their mothers (the mother bathes, strokes, nurses, and hugs them), Freud thought that it was natural for them to have a desire for their mothers. It is very important to note, however, that Freud purposefully used *sexual* terms, even when a less polarizing notion like "pleasurable" could readily have served. That is, for Freud, anything pleasurable was roughly what he intended by his *sexual* language. Heidbreder (1933) summarized the Freudian use of the word *sex:*

> Freud used the word "sex" in a very general sense. He includes in it not only the specifically sexual interests and activities, but the whole love life—it might almost be said, the whole pleasure life—of human

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> beings. The list of activities that he and his followers have seen as having a sexual significance is almost inexhaustible; but its range and variety may be indicated by the fact that it includes such simple practices as walking, smoking, and bathing, and such complex activities as artistic creation, religious ceremonial, social and political institutions, and even the development of civilization itself. (p. 389)

It is often assumed that Freud's extensive use of sexual language, for example, even in his psychosexual stages—oral, anal, phallic, etc.—ran purposefully contrary to the Victorian morality of the time. Yet, this contention may not be true. Views of sexuality very similar to those proposed by Freud had already been offered by individuals such as Krafft-Ebing, Albert Moll (1862–1939), and Havelock Ellis (1859–1939), so that sexology was very much in vogue when Freud was developing his theory (Foucault, 1976). In the case of the Oedipus complex, the mother is the source of all the young child's pleasures—being held, being fed, being comforted, and so on, and the father clearly has priority for her attentions.

> He wishes to possess her physically in such ways as he has divined from his observations and intuitions about sexual life.… His father now becomes a rival who stands in his way and whom he would like to get rid of. (Freud, 1940/1969, p. 46)

So the male child is in competition with the father who also desires the mother, but the reality of the situation (that the father is much more powerful than the child) causes the child to repress his desires for the mother and his hostility toward the father. According to Freud, however, repressed ideas do not go away; they continue to manifest themselves in dreams, symptoms, or unusual behavior. For example, it became clear to Freud that his overreaction to his father's death had been at least partially motivated by the guilt he felt from wishing his father would die.

Freud believed that the Oedipus conflict is universal among male children and that its remnants in adult life explain much normal and abnormal behavior. At this point, Freud had the vehicle he needed for explaining the seduction fantasies he had presumably observed in so many of his patients. He now saw such fantasies as representing repressed desires to possess the parent of the opposite sex and to eliminate the same-sex parent. Such desires, Freud concluded, are as natural and universal as the need to repress them, and so *infantile sexuality* became an important ingredient in his general theory of unconscious motivation.

THE PSYCHOPATHOLOGY OF EVERYDAY LIFE

Freud's next major work following *The Interpretation of Dreams* was *Psychopathology of Everyday Life* (1901/1960b) in which he discussed **parapraxes** (singular, *parapraxis*). Parapraxes are relatively minor errors in everyday living, such as slips of the tongue (Freudian slips), forgetting things, losing things, small accidents, and mistakes in writing. According to Freud, all behavior is motivated; so for him, it was legitimate to seek the causes of all behavior, "normal" or "abnormal." Furthermore, he believed that because the causes of behavior are usually unconscious, people seldom know why they act as they do. Freud pointed out that parapraxes are often unconsciously motivated.

> Freud is never at a loss to find evidence for his theories in the commonplace incidents we dismiss as insignificant or attribute to chance. Slips of the tongue and slips of the pen, forgotten names and forgotten appointments, lost gifts and mislaid possessions, all point to the role of wish and motive. Such happenings, Freud insists, are by no means accidental. The woman who loses her wedding ring wishes that she had never had it. The physician who forgets the name of his rival wishes that name blotted out of existence. The newspaper that prints "Clown Prince" for "Crown

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> Prince" and corrects its error by announcing that of course it meant "Crown Prince," really means what it says. Even untutored common sense had a shrewd suspicion that forgetting is significant; one rarely admits without embarrassment that he failed to keep an appointment because he forgot it. Events of this sort are always determined. They are even overdetermined.… A young business man, for example, striving to be generous to a rival, and intending to say "Yes, he is very efficient," actually said, "Yes, he is very officious." Obviously he was slipping into an easy confusion of words, but he was also expressing his real opinion. (Heidbreder, 1933, pp. 391–392)

In the preceding quotation, Heidbreder used the term *overdetermined* in regard to acts of forgetting and errors in speech. The concept of **overdetermination** is very important in Freudian theory. In general, it means that behavioral and psychological acts often have more than one cause. A dream, for example, may partially satisfy several needs at the same time, as may a hysterical symptom.

Humor. Freud (1905/1960a) indicated that people often use jokes to express unacceptable sexual and aggressive tendencies. Like dreams, jokes exemplify wish fulfillments; so, according to Freud, jokes offer a socially approved vehicle for being obscene, aggressive or hostile, even critical, or blasphemous. Viewed in this way, jokes offer a way of venting repressed, anxiety-provoking thoughts. Freud said that we laugh most at those things that cause us the most anxiety. However, to be effective, jokes, like dreams, must disguise the true sexual or aggressive motives behind them, or they would cause too much anxiety. Freud believed that a joke often fails because the motive it expresses is too blatant, in the same way that a nightmare is a failed dream from which one awakes because the motive expressed is too powerful for dream work to disguise.

Thus, in his search for the contents of the unconscious mind, Freud made use of free association, dream analysis, slips of the tongue, memory lapses, "accidents," gestures and mannerisms, what the person finds humorous, and literally everything else the person does or says.

Religion. Freud showed his pessimism about human nature in *The Future of an Illusion* (1927/1961a), which was his major statement on religion. In this book, Freud contended that the basis of religion is the human feeling of helplessness and insecurity. To overcome these feelings, we create a powerful father figure who will supposedly protect us, a father figure symbolized in the concept of God. The problem with this practice, according to Freud, is that it keeps humans operating at a childlike, irrational level. The dogmatic teachings of religion inhibit a more rational, realistic approach to life. In *Civilization and Its Discontents* (1930/1961b), he said,

> The whole thing [religion] is so patently infantile, so foreign to reality, that to anyone with a friendly attitude to humanity it is painful to think that the great majority of mortals will never be able to rise above this view of life. (p. 22)

For Freud, our only hope is to come to grips with the repressed forces that motivate us; only then can we live rational lives. Just as Freud refused to take pain-killing drugs during his 16-year bout with cancer, he believed that humans could and should confront reality without religious or any other type of intoxicating illusions.

It was Freud's hope that religious illusions would eventually be replaced by scientific principles as guides for living. Scientific principles are not always flattering or comforting, but they are rational:

> No belittlement of science can in any way alter the fact that it is attempting to take account of our dependence on the real external world, while religion is an illusion and it derives its strength from its

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> readiness to fit in with our instinctual wishful impulses. (Freud, 1933/1966b, pp. 638–639)

And elsewhere Freud said, “Our science is no illusion. But an illusion it would be to suppose that what science cannot give us we can get elsewhere” (1927/1961a, p. 71).

Freud’s Trip to the United States

As Freud’s fame grew, he began to attract disciples. In 1902 Freud began meeting on Wednesday evenings with a small group of his followers in the waiting room outside his office. This group, called the Wednesday Psychological Society, became the Vienna Psychoanalytic Society in 1908. By Freud’s own account, psychoanalysis remained rather obscure until he and two of his disciples, Carl Jung and Sandor Ferenczi, were invited to Clark University in 1909 by G. Stanley Hall (Rosenzweig, 1992). Aboard ship, Freud saw a cabin steward reading *Psychopathology of Everyday Life* and thought for the first time that he might be famous (E. Jones, 1955). Freud was 53 years old at the time.

After a few days of sightseeing, Freud began his series of five lectures. Each lecture was prepared only a half-hour before it was given, and preparation consisted of a walk and discussion with Ferenczi. Freud delivered the lectures in German without any notes. Although his lectures were met with some criticism, reactions were generally favorable. Supposedly, none other than William James said to Ernest Jones, Freud’s friend, colleague, and, later, his biographer, “The future of psychology belongs to your work” (E. Jones, 1955, p. 57).

Freud was deeply grateful that his visit to Clark University had given psychoanalysis international recognition, but still he returned to Germany with a negative impression of the United States. He said to Ernest Jones, “America is a mistake; a gigantic mistake it is true, but none the less a mistake” (E. Jones, 1955, p. 66). Hale (1971) summarized what Freud liked and did not like about the United States:

> At the time, the trip aroused Freud’s hope that there might be a future for psychoanalysis in the United States. He made lasting friendships with a few Americans. Yet he was puzzled and somewhat distrustful, amused but not pleased, by what he had seen—Worcester, the Adirondacks, Coney Island, his first movie, full of wild chasing. He admired Niagara Falls—it was grander and larger than he had expected. He was charmed by a porcupine and by the Greek antiquities at the Metropolitan Museum. Yet the American cooking irritated his stomach; the free and easy informality irked his sense of dignity. He learned of a popular mania for religious mind cures, and he detected a distressing potential lay enthusiasm for his hard-won discoveries. (p. 4)

After his trip to the United States, Freud’s fame and that of psychoanalysis grew rapidly. In 1910 the International Training Commission was organized to standardize the training of psychoanalysts. However, not everything went well for Freud. In 1911 Alfred Adler, an early disciple of Freud’s, broke away to develop his own theory; this was closely followed by the defection of Carl Jung. Freud worried that such defections would contaminate psychoanalytic doctrine; thus, in 1912 he established a committee of loyal disciples to ensure the purity of psychoanalytic theory. This inner circle consisted of Karl Abraham, Sandor Ferenczi, Ernest Jones, Wilhelm Stekel, Otto Rank, and Hans Sachs. In time, even members of this group would disagree with Freud.

A REVIEW OF FREUD’S THEORY OF PERSONALITY

The components of Freud’s theory of personality are widely known, so we will simply review them here.

The Id, Ego, and Superego

Early in his theorizing, Freud differentiated among the conscious, the preconscious, and the unconscious.

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Consciousness consists of those things of which we are aware at any given moment. The preconscious consists of the things of which we are not aware but of which we could easily become aware. The unconscious consists of those thoughts and feelings that are being actively repressed from consciousness and are therefore made conscious only with great effort. Later, Freud summarized and expanded these views with his concepts of the id, ego, and superego.

The Id. The **id** (from the German *das es*, meaning "the it") is the generative force of the personality. It contains all the **instincts** (although better translations of the word Freud used might be "drives" or "forces") such as hunger, thirst, and sex. The id is entirely unconscious and is governed by the *pleasure principle*. When a need arises, the id wants immediate gratification of that need. The collective energy associated with the instincts is called **libido** (the Latin word for "lust"), and libidinal energy accounts for most human behavior.

The id has only two means of satisfying a need. One is *reflex action*, which is automatically triggered when certain discomforts arise: Sneezing and recoiling from a painful stimulus are examples of reflex actions. The second means of satisfaction is wish fulfillment, in which the id conjures up a representation of an object that will satisfy the existing need.

Because the activities in the id occur independently of personal experience and because they provide the foundation of the entire personality, Freud referred to them as *primary processes*. The primary processes are irrational because they are directly determined by a person's need state, they tolerate *no* time lapse between the onset of a need and its satisfaction, and they exist entirely on the unconscious level. Furthermore, the primary processes can, at best, furnish only temporary satisfaction of a need; therefore, another aspect of the personality is necessary if the person is to survive.

The Ego. The **ego** (meaning "I" in Latin, and from the German *das ich*, meaning "the I") is aware of the needs of *both* the id and the physical world, and its major job is to coordinate the two. In other words, the ego's job is to match the wishes of the id with their counterparts in the physical environment. For this reason, the ego is said to operate in service of the id. The ego is also said to be governed by the *reality principle*, because the objects it provides must result in *real* rather than imaginary satisfaction of a need.

If the id and the ego were the only two components of the personality, humans could hardly be distinguished from other animals. There is, however, a third component of the personality that vastly complicates matters.

The Superego. Although the newborn child is completely dominated by the id, the child must soon learn that need gratification usually cannot be immediate. More important, he or she must learn that some things are "right" and some things are "wrong." For example, the male child must inhibit his sexual desires. Teaching these do's and don'ts is usually what is meant by socializing the child.

As the child internalizes these do's and don'ts, he or she develops a **superego** (from the German *das überich*, meaning "the over I"), which is the moral arm of the personality. The fully developed superego has two divisions: The *conscience* and also the *ego-ideal*, that is, the internalized experiences for which the child has been rewarded. Once the superego develops, internalized values govern the child's behavior and thoughts, usually those of the parents; and the child is then said to be socialized.

Life and Death Instincts. Later in his theorizing, Freud (1920/1955b) differentiated between life and death instincts. Initially, Freud had equated libido with sexual energy, but because of increased evidence to the contrary and because of severe criticism from even his closest colleagues, he expanded the notion of libido to cover all energizing instincts including sex, hunger, and thirst. When all needs are satisfied, the person is in a state of minimal tension. One of life's major goals is to seek this state of needlessness that corresponds to complete satisfaction.

What happens if the above discussion is carried an additional step? Quoting Schopenhauer, Freud

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said that "the aim of all life is death" (1920/1955b, p. 38). Thus, besides the life instincts, there is a **death instinct** called *thanatos* (named after the Greek god of death). The life instincts seek to perpetuate life, and the death instinct seeks to terminate it. So, to all the other conflicts that occur among the id, ego, and superego, Freud added a life-and-death struggle. When directed toward one's self, the death instinct manifests itself as suicide or masochism; when directed outwardly, it manifests itself as destruction and general aggression. For Freud, then, aggression is a natural component of human nature.

No wonder the ego was referred to as the executive of the personality. Not only does it need to deal with real environmental problems, but it also needs to satisfy the needs of the id in ways that do not alienate the superego. Another of its jobs is to minimize the anxiety that arises when one *does* act contrary to one's internalized values. To combat such anxiety, the ego could employ the defense mechanisms to which we turn next.

Anxiety and the Ego Defense Mechanisms

Anxiety. Anxiety is a warning of impending danger, and Freud distinguished three types. *Objective anxiety* arises when there is an objective threat to the person's well-being. For example, being physically attacked by another person or an animal would cause objective anxiety. *Neurotic anxiety* arises when the ego feels that it is going to be overwhelmed by the id—in other words, when the needs of the id become so powerful that the ego feels that it will be unable to control them and that the irrationality of the id will manifest itself in the person's thought and behavior. *Moral anxiety* arises when one is about to violate an internalized value. We experience moral anxiety as shame or guilt. It is the self-punishment we experience when we act contrary to the values internalized in the superego.

Any form of anxiety is uncomfortable, and the individual experiencing it seeks its reduction or elimination just as one would seek to reduce hunger, thirst, or pain. It is the ego's job to deal with anxiety. To reduce objective anxiety, the ego must deal effectively with the physical environment. To deal with neurotic and moral anxiety, the ego must use processes that Freud called the **ego defense mechanisms**. Freud believed that all ego defense mechanisms have two things in common: They distort reality, and they operate on the unconscious level—that is, a person is unaware of the fact that he or she is using one.

The Ego Defense Mechanisms. *Repression* is the fundamental defense mechanism because it is involved in all others. Repressed ideas enter consciousness only when they are disguised enough that they do not cause anxiety. Modified repressed ideas show up in dreams, in humor, in physical symptoms, during free association, and in parapraxes. *Displacement* is another important defense mechanism. In general, displacement involves replacing an object or goal that provokes anxiety with one that does not. When displacement involves substituting a nonsexual goal for a sexual one, the process is called *sublimation*. Freud considered sublimation to be the basis of civilization. Because we often cannot express our sexual urges directly, we are forced to express them indirectly in the form of poetry, art, religion, sports, politics, education, and everything else that characterizes civilization. Thus, Freud viewed civilization as a compromise. For civilization to exist, humans must inhibit direct satisfaction of their basic urges. Freud believed that humans are animals frustrated by the very civilization they create to protect themselves from themselves. Freud said, "Sublimation of instinct is an especially conspicuous feature of cultural development; it is what makes it possible for higher psychical activities, scientific, artistic or ideological, to play such an important part in civilized life" (1930/1961b, p. 49).

Another way to deal with an anxiety-provoking thought is to attribute it to someone or something other than one's self. Such a process is called *projection*. One sees the causes of failure, undesirable urges, and secret desires as "out there" instead of in the self because seeing them as part of one's self would cause anxiety. Also, when one feels frustrated and anxious because one has not lived up to some internalized value, one can symbolically borrow someone else's success through the process of *identification*. Thus, if one dresses, behaves, or talks the way a person considered successful does, some of that person's success becomes one's own. *Rationalization* involves giving a rational and logical, but false, reason for a failure or shortcoming rather than the true reason for it. Sometimes, when people have a desire to do something but doing it would cause anxiety, they do the opposite of what they really want to do. This is called *reaction formation*. Thus, the male with strong homosexual tendencies becomes a Don Juan type, the mother who hates her child becomes overindulgent, the person with strong antigovernment leanings becomes a superpatriot, or the person with strong sexual urges becomes a preacher concerned with pornography, promiscuity, and the sinfulness of today's youth (Cramer, 2000).

Psychosexual Stages of Development

Although Freud considered the entire body to be a source of sexual pleasure, he believed that this pleasure was concentrated on different parts of the body at different stages of development. At any stage, the area of the body on which sexual pleasure is concentrated is called the *erogenous zone*. The erogenous zones give the stages of development their respective names. According to Freud, the experiences a child has during each stage determine, to a large extent, his or her adult personality. For this reason, Freud believed that the foundations for one's adult personality are formed by the time a child is about five years old.

The Oral Stage. The *oral stage* lasts through about the first year of life, and the erogenous zone is the mouth. Pleasure comes mainly through the lips, tongue, and such activities as sucking, chewing, and swallowing. If either *overgratification* or *undergratification* (frustration) of the oral needs causes a *fixation* to occur at this level of development, as an adult the child will be an *oral character*. Fixation during the early part of the oral stage results in an *oral-incorporative character*. Such a person tends to be a good listener and an excessive eater, drinker, kisser, or smoker; he or she also tends to be dependent and gullible. A fixation during the latter part of the oral stage, when teeth begin to appear, results in an *oral-sadistic character*. Such a person is sarcastic, cynical, and generally aggressive.

The Anal Stage. The *anal stage* lasts through about the second year of life, and the erogenous zone is the anus-buttocks region of the body. Fixation during this stage results in an *anal character*. During the first part of the anal stage, pleasure comes mainly from activities such as feces expulsion, and a fixation here results in the adult having an *anal-expulsive character*. Such a person tends to be generous, messy, or wasteful. In the latter part of the anal stage, after toilet training occurs, pleasure comes from being able to withhold feces. A fixation here results in the person becoming an *anal-retentive character*. Such an adult tends to be a collector and to be stingy, orderly, and perfectionistic.

The Phallic Stage. The *phallic stage* lasts from about the beginning of the third year to the end of the fifth year, and the erogenous zone is the genital region of the body. Because Freud viewed the clitoris to be a small penis, the phallic stage describes the development of both male and female children. The most significant events that occur during this stage are the male and female Oedipal complexes. According to Freud, both male and female children develop strong, positive, even erotic feelings toward their mother because she satisfies their needs. These feelings persist in the boy but typically change in the girl. The male child now has an intense desire for his mother and jealous hostility toward his father, who he perceives as a rival for his mother's love. Because the source of his pleasurable feelings toward his mother is his penis and because he sees his father as much more powerful than he, the male child begins to experience *castration anxiety*, which causes him to repress his sexual and aggressive tendencies.

The male child resolves the problem by identifying with the father. This identification accomplishes two things: Symbolically becoming his father (through identification) allows the child to share the mother; and it removes his father as a threat, thus reducing the child's castration anxiety. The female child's situation is much different from the male's. Like the male child, the female starts out with a strong attraction and attachment to the mother. She soon learns, however, that she lacks a penis and she blames the mother for its absence. She now has both positive and negative feelings toward her mother. At about the same time, she learns that her father possesses the valued organ, which she wants to share with him. This causes a sexual attraction toward the father, but the fact that her father possesses something valuable that she does not possess causes her to experience *penis envy*. Thus, the female child also has ambivalent feelings toward her father. To resolve the female Oedipal complex in a healthy way, the female child must repress her hostility toward her mother and her sexual attraction to her father. Thereafter, she "becomes" the mother and shares the father.

The repression and strong identification necessary during this stage result in the full development of the superego. When a child identifies with his or her parent of the same sex, the child introjects that parent's moral standards and values. Once these standards are introjected, they control the child for the rest of his or her life. For this reason, psychoanalysts believe the final and complete formation of the superego goes hand in hand with the resolution of the Oedipal complexes.

One of the major reasons Freud believed that the male's and female's experiences during the phallic stage are not symmetrical is the fact that a key ingredient in the male experience is castration anxiety. Because the female is already castrated (symbolically), she never has the intense motivation to defensively identify with the potential castrator. Because such identification results in the development of the superego, Freud reached the controversial conclusion that the male superego (morality) is stronger than that of the female.

Clearly, Freud viewed women as more enigmatic than men. He once commented to his close friend Princess Marie Bonaparte that "the great question that has never been answered and which I have not yet been able to answer, despite my thirty years of research into the feminine soul, is 'What does a woman want?'" (E. Jones, 1955, p. 421).

The Latency Stage. The *latency stage* lasts from about the beginning of the sixth year until puberty. Because of the intense repression required during the phallic stage, sexual activity is all but eliminated from consciousness during the latency stage. This stage is characterized by numerous substitute activities, such as schoolwork and peer activities, and by extensive curiosity about the world.

The Genital Stage. The *genital stage* lasts from puberty through the remainder of one's life. With the onset of puberty, sexual desires become too intense to repress completely, and they begin to manifest themselves. The focus of attention is now on members of the opposite sex. If everything has gone correctly during the preceding stages, this stage will culminate in dating and eventually marriage.

The undergratifications or overgratifications and fixations that a person experiences (or does not experience) during the psychosexual stages will determine the person's adult personality. If the person has adjustment problems later in life, the psychoanalyst looks into these early experiences for solution to the problems. For the psychoanalyst, childhood experience is the stuff of which neuroses or normality are made. Indeed, psychoanalysts believe that "the child is father to the man" (Freud, 1940/1969, p. 64).

FREUD'S FATE

Even while suffering from cancer in the later years of his life, Freud continued to be highly productive. However, when the Nazis occupied Austria in 1936, his situation became increasingly precarious. Psychoanalysis had already been labeled as "Jewish

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science" in Germany, and his books were banned there. In Vienna, the Nazis destroyed Freud's personal library and publicly burned all his books found in the Vienna public library. About this Freud said, "What progress we are making. In the Middle Ages they would have burnt me; nowadays they are content with burning my books" (E. Jones, 1957, p. 182). Freud resisted as long as he could but eventually decided it was time to leave Vienna. To do so, however, he was required to sign a document attesting to the respectful and considerate treatment he had received from the Nazis; to this document, Freud added the comment (sarcastically, of course), "I can heartily recommend the Gestapo to anyone" (Clark, 1980, p. 511). When Freud left Vienna, he had to leave his sisters behind, and he died without knowing that they were all soon to perish in Nazi concentration camps.

With his daughter Anna, Freud first journeyed to Paris, where their close friend Princess Marie Bonaparte and one of Freud's sons received them. Shortly afterward, they traveled to London, where they took up residence at 20 Maresfield Gardens in Hampstead, North London. Freud was well received in England and, although in great pain, he continued to write, see patients, and occasionally attend meetings of the London Psychoanalytic Society. On June 28, 1938, three secretaries from the London Royal Society brought to Freud's home the "sacred book of the Society" for his signature; among the other signatures in the book were those of Newton and Darwin. Freud was *very* pleased. It was in London that Freud completed his last book, *Moses and Monotheism* (1939/1964b), and he died the same year at the age of 83. Freud's wife Martha died 12 years later in 1951, at the age of 90.

Freud had reached an agreement with his physician, Max Schur, that when Freud's condition became hopeless, Schur would assist him in dying. Gay (1988) describes Freud's final days:

> Schur was on the point of tears as he witnessed Freud facing death with dignity and without self-pity. He had never seen anyone die like that. On September 21, Schur injected Freud with three centigrams of morphine—the normal dose for sedation was two centigrams—and Freud sank into a peaceful sleep. Schur repeated the injection, when he became restless, and administered a final one the next day, September 22. Freud lapsed into a coma from which he did not awake. He died at three in the morning, September 23, 1939. (p. 651)

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Sigmund and Anna Freud

Revisions of the Freudian Legend

We have already examined two recent modifications of the Freudian legend: the dubious circumstances under which Freud revised his seduction theory and that many of his ideas were not as courageous and innovative as he and his followers claimed (such as his ideas concerning infantile sexuality, dream analysis, and male hysteria). According to Ellenberger (1970), Freud and his followers purposefully attempted to create an image of Freud as a lonely, heroic figure who was discriminated against because he was a Jew and because his ideas

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were so revolutionary that the established medical community could not accept them. According to Ellenberger (1970), the Freudian legend had two main components:

> The first is the theme of the solitary hero struggling against a host of enemies, suffering "the slings and arrows of outrageous fortune" but triumphing in the end. The legend considerably exaggerates the extent and role of anti-Semitism, of the hostility of the academic world, and of alleged Victorian prejudices. The second feature of the Freudian legend is the blotting out of the greatest part of the scientific and cultural context in which psychoanalysis developed, hence the theme of the absolute originality of the achievements, in which the hero is credited with the achievements of his predecessors, associates, disciples, rivals, and contemporaries. (p. 547)

Freud and his followers had a very low tolerance for criticism and usually accused critics of resistance, lack of understanding, or even bigotry. However, Sulloway (1979) points out that most of the criticisms of psychoanalysis were valid:

> In addition to the criticisms that had already been raised before Freud acquired a substantial following, common objections against psychoanalysis now began to include: (1) that psychoanalysts were continually introducing their assertions with the statement, "We know from psychoanalytic experience that … ," and then leaving the burden of proof to others; (2) that Freud's disciples refused to listen to opinions that did not coincide with their own; (3) that they never published statistics on the success of their method; (4) that they persisted in claiming that only those who had used the psychoanalytic method had the right to challenge Freud; (5) that they saw all criticism as a form of "neurotic resistance"; (6) that psychoanalysts tended to ignore all work that had been done before them and then proceeded to make unwarranted claims about their own originality; (7) that they frequently addressed themselves to the wider lay audience as if their theories were already a proven fact, thus making their opponents seem narrow-minded and ignorant; (8) that so-called wild analysts, or individuals without proper training, were analyzing patients in irresponsible ways; and (9) that Freud's followers were becoming a sect, with all of the prominent features of one, including a fanatical degree of faith, a special jargon, a sense of moral superiority, and a predilection for marked intolerance of opponents. In their contemporary context, such criticisms were considerably more rational and had far more merit than traditional psychoanalytic historians have been willing to admit. (p. 460)

The Reality of Repressed Memories

Concerning his seduction theory, Freud believed the mistake he made was accepting the stories of seduction his patients told as true. As we have seen, Masson (1984) believed the opposite. For Masson, Freud's mistake was rejecting the seduction stories as true and accepting them as fantasies instead. But a careful reading of Freud's "The Aetiology of Hysteria" (1896), and two other articles he wrote on his seduction theory in the same year, suggests that *none* of Freud's patients reported a seduction of any kind. There is now some evidence that Freud entered the therapeutic process with a strong conviction that hysteria had a sexual origin and that he manipulated events during therapy so that his theory was confirmed: "A consideration of all the evidence … points to the conclusion that Freud's early patients, in general, did *not* recount stories of infantile seductions, these stories were actually analytic reconstructions which he foisted on them" (Esterson, 1993, pp. 28–29; see also, Esterson, 1998, 2001).

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Freud noted that a physician does not require that a patient know the nature of his or her ailment before it can be effectively treated. Similarly, psychoanalysts assume that patients are ignorant of the origins of their symptoms. It is the analyst who must define the ailment, determine its cause and cure, and then *inform* the patient of these matters. Freud assumed seduction was present in a hysteric's history whether the patient realized it or not; the disease required it (Gleaves & Hernandez, 1999, 2002). In "The Aetiology of Hysteria" (1896, reprinted in Masson, 1984), Freud pondered the idea that analysts could encourage patients to have certain ideas through suggestion or that patients may invent stories of seduction:

> Is it not very possible … that the physician forces such scenes upon his docile patients, alleging that they are memories, or else that the patients tell the physician things which they have deliberately invented or have imagined and that he accepts those things as true? (p. 264)

The suggestive nature of Freud's technique was well known to a number of Freud's contemporaries. French psychologist and psychotherapist Pierre Janet (1925) said, "The psychoanalysts invariably set to work in order to discover a traumatic memory, with the *a priori* conviction that it is there to be discovered.… Owing to the nature of their methods, they can invariably find what they seek" (p. 65).

It is also important to note that even while Freud was embracing his seduction theory, in no case did he implicate parents in the seductions. Rather, he implicated nursemaids, governesses, domestic servants, adult strangers, teachers, tutors, and in most cases brothers who were slightly older than the sisters they supposedly seduced. Immediately after abandoning his seduction theory, Freud claimed that seduction stories were created by patients to mask memories of real infantile sexual experiences, such as masturbation or to infantile incestuous desires directed at the parent of the opposite sex. In his *An Autobiographical Study* (1925/1952), Freud remembered the events surrounding first his acceptance and then his rejection of the seduction theory much differently than his account of them in 1896:

> Under the pressure of the technical procedure which I used at that time, the majority of my patients reproduced from their childhood scenes in which they were sexually seduced by some grown-up person. With female patients the part of seducer was almost always assigned to their father. I do not believe even now that I forced the seduction-phantasies upon my patients, that I "suggested" them. I had in fact stumbled for the first time upon the *Oedipus complex*, which was later to assume such an overwhelming importance. (pp. 36–37)

Esterson (1993; see also Crews, 1995) notes that Freud's clinical method allowed him to corroborate whatever theoretical notions he was entertaining at the time. Similar concerns were raised by the contemporary Viennese philosopher Ludwig Wittgenstein (Chapter 20). Although in places his comments are positive (his sister was a satisfied patient of Freud), he was also wary:

> [Freud] is full of fishy thinking & his charm & the charm of [his] subject is so great that you may be easily fooled..… Unless you think *very* clearly psycho-analysis is a dangerous & a foul practice & it's done no end of harm &, comparatively, very little good. *So hold on to your brains.* (Malcolm, 2001, p. 39)

Elsewhere Wittgenstein said, "Freud's fanciful pseudo-explanations, precisely because they are so brilliant, perform a disservice. Now any ass has these pictures available for use in 'explaining' symptoms of illness" (Cioffi, 1998, p. 79).

Current Concern about Repressed Memories. As we will see in Chapter 19, modern cognitive psychologists understand that memories are complex phenomenon, frequently influenced by a variety of internal and external factors (Loftus, 1979; Neisser, 1982). Although many researchers accept the concept of repressed memories as valid (for example, Erdelyi, 1985; Frawley, 1990; Rieker & Carmen, 1986; Schuker, 1979; M. Williams, 1987), many do not. Elizabeth Loftus, in her article "The Reality of Repressed Memories" (1993), recognizes that childhood sexual abuse is tragically common and constitutes a major social problem. She does, however, question the repression and subsequent recovery of the memory of such experiences. From her own research, and after reviewing the literature on the topic, Loftus concludes that most, if not all, reports of *repressed* memories are false. If her conclusion is accurate, why do so many individuals claim to have such memories? One possible reason is that the creation of such memories satisfies a personal need:

> The internal drive to manufacture an abuse memory may come about as a way to provide a screen for perhaps more prosaic but, ironically, less tolerable, painful experiences of childhood. Creating a fantasy of abuse with its relatively clear-cut distinction between good and evil may provide the needed logical explanation for confusing experiences and feelings. The core material for the false memories can be borrowed from the accounts of others who are either known personally or encountered in literature, movies, and television. (Loftus, 1993, p. 525)

According to Loftus, the popular literature is filled with material that suggests or even encourages a belief in repressed memories. The "bible" of such books is *The Courage to Heal* (Bass & Davis, 1988). This book suggests that people with low self-esteem, suicidal or self-destructive thoughts, depression, or sexual dysfunction were probably victims of childhood sexual abuse, even if they have no recollection of it. About this book, Loftus (1993) says, "Readers without any abuse memories of their own cannot escape the message that there is a strong likelihood that abuse occurred even in the absence of such memories" (p. 525). Other "checklists" suggest people were probably victims of childhood abuse if they have trouble knowing what they want, are afraid of having new experiences, cannot remember parts of their childhood, have a feeling that something bad happened to them, or are intimidated by authority figures (Loftus & Ketcham, 1994). School performance such as failing grades, decreased interest, and difficulty in concentrating have also been suggested as signs of abuse (Davies & Frawley, 1994). With these criteria, almost anyone can suspect that they were the victim of childhood abuse. As Loftus (1994) accurately observes, "If everything is a sign of past childhood sexual abuse, then nothing is" (p. 444).

According to Loftus, the fact that so many individuals enter therapy without memories of abuse, but leave with them, should make one wonder about what is going on in therapy. Loftus (1993) cites numerous examples of how therapists suggest memories of abuse to their clients and reaches the following conclusion:

> If therapists ask questions that tend to elicit behaviors and experiences thought to be characteristic of someone who had been a victim of childhood trauma, might they too be creating this social reality?

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Elizabeth Loftus

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> Whatever the good intentions of therapists, the documented examples of rampant suggestion should force us to at least ponder whether some therapists might be suggesting illusory memories to their clients rather than unlocking authentic distant memories.… What is considered to be present in the client's unconscious mind might actually be present solely in the therapist's conscious mind. (p. 530)

Researchers, such as Loftus, do not deny that many individuals have had traumatic experiences as children or that therapy can help them cope with or overcome the memories of such experiences. It is the supposed repression and the procedures employed to recover "repressed memories" that are being questioned:

> Many tortured individuals live for years with the dark secret of their abusive past and only find the courage to discuss their childhood traumas in the supportive and empathic environment of therapy. We are not disputing those memories. We are only questioning the memories commonly referred to as "repressed"—memories that did not exist until someone went looking for them. (Loftus & Ketcham, 1994, p. 141)

Loftus (1993) believes that many questions surrounding the area of repression remain essentially unanswered, and they must be addressed in an objective manner:

> Is it possible that the therapist's interpretation is the cause of the patient's disorder rather than the effect of the disorder?… Is it necessarily true that people who cannot remember an abusive childhood are repressing the memory? Is it necessarily true that people who dream about or visualize abuse are actually getting in touch with true memories? (p. 534)

Loftus (1993) warns that until answers to questions like those above are provided, "zealous conviction is a dangerous substitute for an open mind" (p. 534). Elsewhere Loftus says,

> My efforts to write about the power of suggestion to create false memories have been with the hope of encouraging changes in procedures and practices.… Aggressive efforts to unearth presumably recalcitrant memories can lead to false- memory reports. Uncritical acceptance of every trauma memory report can harm the false victims and, also sadly, trivialize the experiences of the true victims. (2003, p. 871)

In 2003 the American Psychological Association (APA) presented Loftus its Award for Distinguished Scientific Applications of Psychology for her over 30 years of research on memory, both real and false. See Loftus (2007) for an interesting and informative autobiographical sketch.

Evaluation of Freud's Theory: Criticisms and Contributions

It should come as no surprise that a theory as broad as Freud's, and one that touched so many aspects of human existence, would receive criticism. The common criticisms of Freud and his theory include the following:

- *Method of data collection.* Freud used his own observations of his patients as his primary source of data. There was no controlled experimentation. Not only did his patients not represent the general population, but his own needs and expectations probably influenced his observations.
- *Dogmatism.* As we have seen, Freud saw himself as the founder and leader of the psychoanalytic movement, and he would tolerate no ideas that conflicted with his own. If a member of his group insisted on disagreeing with him, Freud expelled that member from the group.
- *Overemphasis on sex.* The main reason many of Freud's early colleagues eventually went their own way was that they believed Freud overemphasized sex as a motive for human

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behavior. Some thought that to speak of sexuality everywhere (even as a metaphor), was extreme and unnecessary. The personality theories that other psychoanalytically oriented theorists developed show that human behavior can be explained just as well, if not better, without a focus on sex.

- *Length, cost, and limited effectiveness of psychoanalysis.* Because psychoanalysis usually takes years to complete, it is not available to most troubled people. Only the most affluent can participate. Furthermore, only reasonably intelligent and mildly neurotic people can benefit from psychoanalysis because patients must be able to articulate their inner experiences and understand the analyst's interpretation of those experiences.
- *Lack of falsifiability.* In Chapter 1, we saw that Karl Popper said Freud's theory was unscientific because it violated the principle of falsification. According to Popper, for a theory to be scientific, it must specify observations that, if made, would refute the theory. Unless such observations can be specified, the theory is unscientific. Popper claimed that within Freudian theory nothing that a person could do would be contrary to what the theory predicted. Let us say, for example, that according to Freudian theory a certain cluster of childhood experiences will make an adult leery of sexual relationships. Instead, we find an adult who has had those experiences seeking and apparently enjoying such relationships. The Freudian can simply say that the person is demonstrating a reaction formation. Thus, no matter what happens, the theory is supported. A related criticism is that psychoanalysts engage in *post*diction rather than *pre*diction. That is, they attempt to explain events after they have occurred rather than predict what events will occur.

Despite the criticisms, Freud made truly exceptional contributions to psychology. The following are usually listed among them:

- *Expansion of psychology's domain.* Like no one before him, Freud pointed to the importance of studying the relationships among such matters as unconscious motivation, infantile experience, and anxiety. Freud's was the first comprehensive theory of personality, and every personality theory since his can be seen as a reaction to his theory.
- *Psychoanalysis.* Freud created a new way of dealing with age-old mental disorders and revolutionized how we conceive of abnormality. The notion of a *Psychopathology of Everyday Life* moves us toward the modern idea of evaluating behavior in terms of its functionality. And, many still believe that psychoanalysis is the best way to understand and treat neuroses.
- *Understanding of normal behavior.* Freud not only provided a means of better understanding abnormal behavior but also explained much of our normal behavior. Dreams, forgetfulness, mistakes, choice of mates, humor, and use of the ego defense mechanisms characterize everyone's life, and Freud's analysis of them was pioneering.
- *Generalization of psychology to other fields.* By showing psychology's usefulness in explaining phenomena in everyday life—religion, sports, politics, art, literature, and philosophy—Freud expanded psychology's relevance to almost every sector of human existence. Additionally, he also created substantial interest in the field of psychology among other professionals (physicians, philosophers, etc.) and the general public.

As influential as Freud's theory has been, much of it has not withstood the rigors of scientific examination; in fact, much of it, as we have seen, is untestable. Why then is Freud's theory so often referred to as a milestone in intellectual history? The answer seems to be that scientific methodology is not the only criterion by which to judge a theory. Structuralism, for example, was highly scientific, requiring controlled, systematic experiments to test its hypotheses. Yet structuralism has faded away while psychoanalysis has remained.

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> It is enlightening to compare psychoanalytic psychology with structuralism, in this respect its antithesis. Structuralism, equipped with a highly developed scientific method, and refusing to deal with materials not amenable to that method, admirably illustrates the demand for exactness and correctness by which science disciplines untutored curiosity. Psychoanalysis, with its seemingly inexhaustible curiosity, at present lacks the means, and apparently at times the inclination, to check its exuberant speculation by severely critical tests. But what it lacks in correctness, it gains in vitality, in the comprehensiveness of its view, and in the closeness of its problems to the concerns of everyday life. (Heidbreder, 1933, pp. 410–411)

BEYOND FREUD

In time, several members of Freud's inner circle would break away to advance their own ideas. Likewise, over the years new voices, often the voices of women, were added to the chorus of psychoanalysis. As we consider these variants and extensions to Freud's work it is important to be mindful of just that—that these alternatives are building on the foundation provided by Freud. Considerations of Adler, Erikson, Jung almost always focus on how they differ from Freud, often without appreciating that much in their theories remained aligned with the canons of psychoanalysis. For example, most of Anna Freud's work reflected her father's views, whereas some of her later contributions—such as those in the area of defense mechanisms—represent important extensions of psychoanalytic orthodoxy.

Anna Freud

Anna Freud (1895–1982), the youngest of Freud's six children, was born in the same year that Breuer and Freud published *Studies on Hysteria*, marking the founding of psychoanalysis. According to Young-Bruehl, "To Anna Freud's reckoning, she and psychoanalysis were twins who started out life competing for their father's attention" (1988, p. 15). As a young child, Anna began describing her dreams to her father, and several of them were included in Freud's *The Interpretation of Dreams* (1900/1953). At the age of 13 or 14, Anna was allowed to attend the Wednesday meetings of the Vienna Psychoanalytic Society by sitting on a library ladder in the corner of the room.

Although Anna became a primary school teacher, her interest in psychoanalysis intensified and, contrary to his own sanction against analysts working with family members, Freud began to psychoanalyze Anna in 1918. In 1922 Anna presented a paper to the Vienna Psychoanalytic Society on childhood fantasies (presumably her own), and two weeks later she was certified as a psychoanalyst.

The discovery of Freud's cancer in 1923 (Anna was 27 years old at the time) brought him and Anna even closer together. As her father's physical condition worsened, Anna successfully competed with her mother to become his primary caregiver. The relationship was reciprocal. With Anna, Freud could have meaningful discussions about psychoanalysis, something he could never do with his wife, who considered psychoanalytic ideas a form of pornography (Gay, 1988, p. 61).

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Anna Freud

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Anna became her father's emissary to psychoanalytic societies throughout the world, delivered his papers, typed his daily correspondence, and, along with his friend and physician Max Schur, attended to his personal and medical needs. When her father died, Anna inherited his library, his cherished antiques, and his ideas. Anna Freud not only preserved and perpetuated her father's ideas, but she extended them into new areas such as child analysis (1928) and education and child rearing (1935). As we shall see, she also made several original contributions to the psychoanalytic literature.

Anna Freud's and Melanie Klein's Conflicting Views on Child Analysis. As Anna Freud began developing her ideas on child analysis, they soon came into conflict with the theories of **Melanie Klein (1882–1960)**. Klein attended the University of Vienna and was analyzed by two members of the Freudian inner circle, Sandor Ferenczi and Karl Abraham. Soon after becoming an analyst, Klein began focusing on children, and was the analyst for Ernest Jones' children. She summarized her ideas in *The Psychoanalysis of Children* (1932). Klein departed from traditional psychoanalysis by emphasizing pre-Oedipal development. She also deemphasized biological drives and highlighted the importance of interpersonal relationships. The mother–child relationship was especially important to Klein. The earliest stage of this relationship focused on the mother's breast, which the infant viewed as either good (satisfying) or bad (frustrating). The good breast satisfies the life instincts and stimulates feelings of love and creativity. The bad breast satisfies the death instinct and stimulates feelings of hate and destruction. According to Klein, the emotions caused by the interaction of the infant's experiences with the mother's breast and with life and death instincts provide the prototype used to evaluate all subsequent experiences. For Klein, notions of good and bad and right and wrong develop during the oral stage, not the phallic stage as the Freudians (including Anna) had asserted.

About the importance of the death instinct in Klein's theory, Gay (1988) said, "If anyone took Freud's death drive with all its implications seriously, it was Melanie Klein" (p. 468). Klein also believed that child analysis could begin much earlier than the traditional psychoanalysts believed by analyzing a child's playful activities instead of the child's free associations. Klein's belief that a child's free, undirected play reveals unconscious conflicts allows children as young as two years old to be analyzed (Segal, 1974).

Anna Freud disagreed with most of Klein's conceptions of child analysis, continuing to emphasize the importance of the phallic and genital stages of development and to analyze children's fantasies and dreams instead of their play activities during therapy. Although Klein's views had a substantial impact on child analysis, it was the views of Anna Freud that generally prevailed.

Ego Psychology. There are significant differences between analyzing children and adults, and these differences caused Anna to emphasize the ego more in child analysis than when treating adults. The major difference is that children do not recall early traumatic experiences as adults do. Rather, children display developmental experiences as they occur. The problems that children have reflect obstacles to their normal growth. Anna Freud (1965) used the term *developmental lines* to describe a child's gradual transition from dependence on external controls to mastery of internal and external reality. **Developmental lines** are attempts by the child to adapt to life's demands, whether those demands are situational, interpersonal, or personal. They describe normal development and therefore can be used as a frame of reference for defining maladjustment.

In her influential book *The Ego and the Mechanisms of Defense* (published in German in 1936; in English in 1937), Anna Freud also emphasized autonomous ego functions. In this book, she described in detail the ego defenses described by her father and others, and she correlated each mechanism with a specific type of anxiety (objective, neurotic, moral). Whereas traditional analysts—including her father—had viewed the ego defenses as obstacles to the understanding of the unconscious, Anna viewed them as having independent importance. She showed how

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the mechanisms are normally used in adjusting to social and biological needs. When normal use is understood, abnormal use is easier to determine. To the traditional list of defense mechanisms, Anna Freud added two of her own. **Altruistic surrender** occurs when a person gives up his or her own ambitions and lives vicariously by identifying with another person's satisfactions and frustrations. **Identification with the aggressor** occurs when a person adopts the values and mannerisms of a feared person as his or her own. Identification with the aggressor also explains why some hostages develop affection toward their captors. In contemporary psychology, the latter tendency is referred to as the Stockholm syndrome. The name derives from the case of a woman who was taken hostage during a 1973 bank robbery in Stockholm, Sweden. During the ordeal, the woman became so emotionally attached to one of the robbers that she subsequently broke off her engagement to another man and remained faithful to her former captor as he served his prison term.

Clearly, Anna Freud overcame her conflict with her "twin," psychoanalysis:

> By the time Anna Freud was thirty and a practicing psychoanalyst as well as a lecturer at the Vienna Psychoanalytic Institute on her specialty, child analysis, she and her twin were no longer rivals. They were merged. In 1936, for his eightieth birthday, she gave her father a book she had written, *The Ego and the Mechanisms of Defense*, which marked a reconfiguration of their lives: she was then the inheritor of her twin, the mother of psychoanalysis; the one to whom primary responsibility for its spirit, its future, was passed. (Young-Bruehl, 1988, p. 15)

In 1950 Anna Freud received an honorary degree from Clark University, as her father had done in 1909. She subsequently received honorary degrees from several other universities, including Harvard, Yale, and Vienna. After devoting nearly 60 years to the analysis of children and adolescents, Anna Freud suffered a stroke in March 1982, and died on October 9.

The analysis of the ego for its own sake, started by Anna Freud, was continued by others and became known as **ego psychology**. For example, Heinz Hartmann (1894–1970) wrote *Ego Psychology and the Problem of Adaptation* (1939/1958). Problems, he said, are often solved in an adaptive manner, without regard to the remnants of infantile experiences. **Erik Erikson (1902–1994)**, in his influential book *Childhood and Society* (1950/1985), described how the ego gains strength as it progresses through eight stages of psychosocial (not psychosexual) development that occur over a person's lifetime. Incidentally, it was Anna Freud who analyzed Erikson, qualifying him to become an analyst himself.

Developmental Milestones. Following his analysis with Anna Freud, Erikson completed his training at the Vienna Psychoanalytic Institute in 1933. After immigrating to the United States, Erikson eventually became a professor of Human Development at Harvard. Although best known for his theory of life-span development, Erikson also earned acclaim (and a Pulitzer Prize) for his work in psycho-history, or the psychoanalytic biographies of famous historical figures such as Martin Luther and Gandhi.

Unlike Freud, Erikson believed that personality continues to develop across the life-span. Extending Freud's developmental stages into adulthood and even old age, Erikson reshaped developmental psychology and helped popularize gerontology. Each of Erikson's eight stages features a "crisis" whose resolution shapes identity. For example, the crisis of young adulthood is intimacy versus isolation as it resolves around the types of enduring social relations (such as marriage, companions, community, etc.) that one typically makes (or not) in college and at the start of a career.

Another psychoanalytic consideration of a key developmental milestone was the work by John Bowlby (1907–1990) and Mary Salter Ainsworth (1913–1999) on mother–infant attachments. A medical doctor trained in psychiatry and psychoanalysis, Bowlby sought to better align Freud's theories with advances from biological psychology, especially work from ethology (animal behavior; Chapter 18). Working from Bowlby's

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theories, Ainsworth developed her "strange situation" methodology. This involved a mother leaving her infant in a strange room, then Ainsworth observing the reaction of the infant, and how the infant responded to the mother's return.

Bowlby and Ainsworth shared a variety of prestigious awards for their work that grounded Freud's ideas in biological psychology, and for providing an empirical basis for extending psychoanalytic theory. Still, of all the neo-Freudians, none is more famous than Carl Jung.

Carl Jung

Born in the Swiss village of Kesswil, **Carl Jung (1875–1961)** was the son of a minister and a minister's daughter. Jung studied medicine at Basel and then worked as a resident under Eugen Bleuler (who coined the term *schizophrenia*). Jung spent the winter of 1902–1903 studying with Pierre Janet. On Bleuler's recommendation, Jung administered Galton's word association test to psychotics in hopes of discovering the nature of their unconscious thought processes. This research was fairly successful and brought Jung some early fame. Jung first became acquainted with Freud's theory when he read *The Interpretation of Dreams*. When Jung tried Freud's ideas in his own practice, he found them effective. He and Freud began to correspond, and eventually they met at Freud's home in Vienna. Their initial meeting lasted 13 hours, and the two became close friends. Ambitious, handsome, even charismatic (and not Jewish)—Freud saw in Jung all the characteristics of a great "front man." That is, as someone who could further popularize psychoanalysis and who would become the heir-apparent.

When G. Stanley Hall invited Freud to give a series of lectures at Clark University in 1909, Jung traveled to the United States with Freud and gave a few lectures of his own (on his word-association research). About this time, Jung began to express concerns about Freud's emphasis on sexual motivation. These issues became so intense that in 1912 the two stopped corresponding, and in 1914 they completely terminated their relationship—despite the fact that Freud had earlier nominated Jung to be the first president of the International Psychoanalytic Association.

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Carl Jung

Jung was competitive as well as ambitious, and some have suggested that the underlying reasons for the split were more personal than professional (McLynn, 1996). Certainly Freud was a great communicator, whereas Jung's writings were often criticized stylistically. Even if frustration or jealousy played a role, the break in the relationship was especially disturbing for Jung, who entered what he called his "dark years," a period during which he was so depressed he could not even read a scientific book (Jung, 1961).

The major source of theoretical difficulty between Freud and Jung was the nature of the **libido**. At the time of his association with Jung, Freud defined *libido* as "sexual energy," which he saw as the main driving force of personality. Jung disagreed, saying that libidinal energy is a creative life force that could be applied to the individual's continuous psychological growth. According to Jung, libidinal energy is used in a wide range of human endeavors beyond those identified by Freud, and it can be applied to the satisfaction of

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both biological *and* intellectual or spiritual needs. In fact, as one becomes more proficient at satisfying the former needs, one can use more libidinal energy in dealing with the latter needs.

According to Jung, the goal of life is to reach self-actualization, which involves the harmonious blending of all aspects of the personality. How the various aspects of personality manifest themselves within the context of a particular person's life is called *individuation*. The job of recognizing and expressing all the forces within us is monumental because these forces often conflict with one another. The rational conflicts with the irrational, feeling with thinking, masculine with feminine, introversion with extroversion, and conscious processes with unconscious processes. Attempting to understand these conflicting forces occupies most of childhood, adolescence, and early adulthood.

For Jung, like Erikson, personality development was not limited to childhood. In fact, it is usually not until the late thirties or early forties that one major transformation occurs. That is, only once a person recognizes the many conflicting forces in his or her personality are they in a position to synthesize and harmonize them. In a healthy, integrated individual, each system of the personality is differentiated, developed, and expressed. Although Jung believed that everyone has an innate tendency toward such self-actualization, he also believed that people rarely attain that state.

The Personal and Collective Unconscious. Combining the Freudian notions of the preconscious and the unconscious, Jung's **personal unconscious** consists of experiences that had either been repressed or simply forgotten—material from one's lifetime that for one reason or another is not in consciousness. Some of this material is easily retrievable, and some of it is not.

The **collective unconscious** was Jung's most mystical (and perhaps controversial) concept, as well as one of his most important. Jung believed the collective unconscious to be the deepest and most powerful component of the personality, reflecting the cumulative experiences of humans throughout their entire evolutionary past. According to Jung, it is the "deposit of ancestral experience from untold millions of years, the echo of prehistoric world events to which each century adds an infinitesimally small amount of variation and differentiation" (1928, p. 162). The collective unconscious registers *common* experiences that humans have had through the eons. These common experiences are recorded and are inherited as predispositions to respond emotionally to certain categories of experience. Jung referred to each inherited predisposition contained in the collective unconscious as an **archetype**.

Thus, for Jung, the mind is not a "blank tablet" at birth but contains a structure that developed in a Lamarckian fashion. That is, experiences of preceding generations are passed on to new generations. Archetypes can be thought of as generic images with which events in one's lifetime interact. They record not only perceptual experiences but also the emotions typically associated with those perceptual experiences. In fact, Jung thought that the emotional component of archetypes is their most crucial feature. When an experience "communicates with" or "identifies with" an archetype, the emotion elicited is typical of the emotional response people have had to that type of experience through the ages. For example, each child is born with a generic conception of mother that is the result of the cumulative experiences of preceding generations, and the child will tend to project onto its own mother the attributes of the generic mother-image. This archetype will influence not only how the child views his or her mother but also how the child responds to her emotionally. For Jung then, archetypes provide each person with a framework for perceptual and emotional experience. They predispose people to see things in certain ways, to have certain emotional experiences, and to engage in certain categories of behavior. One such category is myth making:

> Primitive humans responded to all of their emotional experiences in terms of myths, and it is this tendency toward myth making that is registered in the collective unconscious and passed on to future

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> generations. What we inherit, then, is the tendency to reexperience some manifestation of these primordial myths as we encounter events that have been associated with those myths for eons. Each archetype can be viewed as an inherited tendency to respond emotionally and mythologically to certain kinds of experience—for example, when a child, a mother, a lover, a nightmare, a death, a birth, an earthquake, or a stranger is encountered. (Hergenhahn & Olson, 2007, p. 75)

Although Jung recognized a large number of archetypes, he elaborated the following ones most fully. The *persona* causes people to present only part of their personality to the public. It is a mask in the sense that the most important aspects of personality are hidden behind it. The *anima* provides the female component of the male personality and a framework within which males can interact with females. The *animus* provides the masculine component of the female personality and a framework within which females can interact with males. The *shadow*, the archetype that we inherit from our prehuman ancestors, provides us with a tendency to be immoral and aggressive. We project this aspect of our personalities onto the world symbolically as devils, demons, monsters, and evil spirits. The *self* causes people to try to synthesize all components of their personalities. It represents the human need for unity and wholeness of the total personality. The goal of life is first to discover and understand the various parts of the personality and then to synthesize them into a harmonious unity. Jung called this unity *self-actualization*.

Jung also described two major orientations, or attitudes, that people take in relating to the world. One attitude he labeled **introversion**, the other **extroversion**. Jung believed that although every individual possesses both attitudes, he or she usually assumes one of the two attitudes more than the other. The introverted person tends to be quiet, imaginative, and more interested in ideas than in interacting with people. The extroverted person is outgoing and sociable. Although most people tend toward either introversion or extroversion, Jung believed that the mature, healthy adult personality reflects both attitudes about equally. The Myers-Briggs Type Indicator (MBTI) is a widely used personality assessment based in part on these ideas (Myers, McCaulley, Quenk, & Hammer, 1981).

Causality, Synchronicity, and Dreams. Like Freud, Jung was a determinist. Both believed that important causes of a person's personality are found in his or her past experiences. However, Jung believed that to truly understand a person, one must understand the person's prior experiences—including those registered in the collective unconscious—*and* the person's goals for the future. Thus, unlike Freud's theory, Jung's embraced teleology (purpose). For Jung, people are both pushed by the past and pulled by the future.

For Jung another important determinant of personality is **synchronicity**, or meaningful coincidence. Synchronicity occurs when two or more events, each with their own independent causality, come together in a meaningful way. Progoff (1973) gives the following examples:

> A person … has a dream or a series of dreams, and these turn out to coincide with an outer event. An individual prays for some special favor, or wishes, or hopes for it strongly, and in some inexplicable way it comes to pass. One person believes in another person, or in some special symbol, and while he is praying or meditating by the light of faith, a physical healing or some other "miracle" comes to pass. (p. 122)

Dreams were important to Jung, but he interpreted them very differently than Freud. Freud believed that repressed, traumatic experiences reveal themselves in dreams because one's defenses are reduced during sleep. During the waking state, these experiences are actively held in the unconscious mind because to entertain them consciously would provoke extreme anxiety. Jung believed that everyone has the same collective unconscious but that individuals differ in their ability to recognize and give expression to the various archetypes. As we have seen, Jung also believed that everyone has an innate tendency to recognize, express, and synthesize the various components of his or her personality and, in so doing, to become self-actualized. Even with this tendency, however, most people are not self-actualized. For most individuals, certain components of the personality remain unrecognized and underdeveloped. For Jung, dreams are a means of giving expression to aspects of the psyche that are underdeveloped. If a person did not give adequate expression to the shadow, for example, he or she would tend to have nightmares involving various monsters. **Dream analysis**, then, can be used to determine which aspects of the psyche are being given adequate expression and which are not.

Criticisms and Contributions. Jung's theory is often criticized for embracing spiritualism and mysticism. Many saw Jung as unscientific or even antiscientific because he used such things as the symbols found in art, religion, and human fantasy to develop his theory. Some refer to Jung's theory in general as unclear, incomprehensible, and inconsistent. Finally, Jung has been criticized for employing the Lamarckian notion of the inheritance of acquired characteristics. Despite these criticisms, Jungian theory remains popular in psychology. Jung has influential followers throughout the world, and several major cities have Jungian institutes that elaborate and disseminate his ideas (DeAngelis, 1994; Kirsch, 2000). In particular, Jung's notions of introversion and extroversion stimulated much research and are part of every major personality measure—for example, the MMPI, the "Big 5," and the MBTI. Also, Jung's concepts of introversion and extroversion were major components of Hans J. Eysenck's (1916–1997) influential theory of personality (for example, Eysenck & Eysenck, 1985).

Alfred Adler

Born in a suburb of Vienna, **Alfred Adler (1870–1937)** remembered his childhood as being miserable. He was a sickly boy who thought of himself as small and ugly. He also had a severe rivalry with his older brother. Like Jung, Adler became acquainted with Freudian psychology by reading *The Interpretation of Dreams* after completing his medical degree. Adler wrote a paper defending Freud's theory and was invited to join the Vienna Psychoanalytic Society, of which he became president in 1910. Differences between Adler and Freud began to emerge, however, and by 1911 they became so pronounced that Adler resigned as president of the society. After a nine-year association with Freud, the friendship crumbled, and the two men never saw each other again. Freud accused Adler of becoming famous by reducing psychoanalysis to the commonsense level of the layperson. About Adler, Freud said, "I have made a pygmy great" (Wittels, 1924, p. 225). Ernest Jones (1955) summarized Adler's major disagreements with Freud:

> Sexual factors, particularly those of childhood, were reduced to a minimum: a boy's incestuous desire for intimacy with his mother was interpreted as the male wish to conquer a female masquerading as sexual desire. The concepts of repression, infantile sexuality, and even that of the unconscious itself were discarded. (p. 131)

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Alfred Adler

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In 1926 Adler visited the United States and was warmly received. Adler made the United States his permanent home in 1935, partially because of the Nazi rise in Europe. He died on May 28, 1937, while on a lecture tour in Aberdeen, Scotland. The animosity that Freud felt toward Adler can be seen in the following comment Freud made to a person who was moved by the news of Adler's death:

> I don't understand your sympathy for Adler. For a Jew boy out of a Viennese suburb a death in Aberdeen is an unheard-of career in itself and a proof of how far he had got on. The world really rewarded him richly for his service in having contradicted psychoanalysis. (E. Jones, 1957, p. 208)

Unlike Freud, who most often saw wealthy clients, Adler focused his practice on the working class (Wassermann, 1958). This no doubt influenced the views of both men. Adler was struck by the common man's constant struggles with the challenges of daily living, and a strong desire to "get ahead" in his clients. Fiebert (1997) provides more details concerning Adler's initial professional involvement with Freud, the sources of dissension between Adler and Freud, and the relationship between the two following Adler's "excommunication."

Inferiority and Compensation. Like Freud, Adler was trained in the materialistic-positivistic medical tradition; that is, every disorder, whether physical or mental, was assumed to have a physiological origin. Adler (1907/1917) presented the view that people are particularly sensitive to disease in organs that are "inferior" to other organs. For example, some people are born with weak eyes, others with weak hearts, still others with weak limbs, and so on. Because of the strain the environment puts on these weak parts of the body, the person develops weaknesses that inhibit normal functioning.

One way to adjust to a weakness is through **compensation**. That is, a person can adjust to a weakness in one part of his or her body by developing strengths in other parts. For example, a blind person can develop keen auditory skills. Another way to adjust to a weakness is through **overcompensation**, which is the conversion of a weakness into a strength. The usual examples include Teddy Roosevelt, who was a frail child but became a rugged outdoorsman, and Demosthenes, who had a speech impediment but became a great orator. At the time when Adler presented this view, he was a physician, and his observations were clearly in accord with the materialistic-positivistic medicine of the time.

In 1910 Adler entered the realm of psychology when he noted that compensation and overcompensation can be directed toward *psychological* inferiorities as well as toward physical ones. Adler noted that *all* humans begin life completely dependent on others for their survival and therefore with **feelings of inferiority**. Such feelings motivate people first as children and later as adults to gain power to overcome these feelings. In his early theorizing, Adler emphasized the attainment of power as a means of overcoming feelings of inferiority; later, he suggested that people strive for perfection or superiority to overcome these feelings.

Although feelings of inferiority motivate all personal growth and are therefore good, they can also disable rather than motivate some people. These people are so overwhelmed by such feelings that they accomplish little or nothing, and they are said to have an **inferiority complex**. Thus, feelings of inferiority can act as a stimulus for positive growth or as a disabling force, depending on one's attitude toward them.

Another psychological variable of interest to Adler was birth order. For example, Adler believed that second-borns, like himself, tended to be ambitious and competitive, and experience sibling rivalry. Eldest children often strive to reach the high expectations of their parents, whereas the youngest child in a family of three or more was likely to be spoiled and immature, even into adulthood.

Worldviews and Lifestyles. Hans Vaihinger's philosophy of "as if" influenced Adler's theory. We saw in Chapter 9 that Vaihinger was primarily concerned with showing how fictions in science,

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mathematics, religion, philosophy, and jurisprudence make complex societal life possible. Like Vaihinger, Adler believed that life is inherently meaningless, and therefore whatever meaning life has must be assigned to it by the individual. A person's worldview develops from early experiences as a child. Depending on the nature of these experiences, a child could come, for example, to view the world as a dangerous, evil place or as a safe and loving place. The first invention of meaning in a person's life, then, is the creation of a worldview. Once a worldview develops, the child ponders how to live in the world as he or she perceives it. The child begins to plan his or her future by creating what Adler called "guiding fictions." These are future goals that are reasonable given the child's worldview. If the worldview is positive, the child might attempt to embrace the world by planning to become a physician, scientist, artist, or teacher, for example. If the worldview is negative, the child might aggress toward the world by planning a life of crime and destruction.

From the worldview come guiding fictions (future goals), and from guiding fictions comes a **lifestyle**. Primarily, a lifestyle encompasses the everyday activities performed while pursuing one's goals. However, a person's lifestyle also determines which aspects of life are focused on, what is perceived and what is ignored, and how problems are solved. According to Adler, for a lifestyle to be truly effective it must contain considerable **social interest**. That is, part of its goal must involve working toward a society that would provide a better life for everyone. Adler called any lifestyle without adequate social interest a mistaken lifestyle. Because the neurotic typically has a mistaken lifestyle, the job of the psychotherapist is to replace that lifestyle with one that contains a healthy amount of social interest.

The Creative Self. Adler departed radically from the theories of Freud and Jung by saying that humans are not mere victims of their environment and biological inheritance. Although environment and heredity provide the raw materials of personality, the person is free to arrange those materials in any number of ways. For example, whether feelings of inferiority facilitate growth or disable a person is dictated by personal choices. And, although life is inherently meaningless, one is free to invent meaning and then act "as if" it were true. Adler's concept of the **creative self** aligned him with the Nietzschean belief that humans are free to choose their own destiny. Indeed, many of Nietzsche's ideas can be found in Adler.

With his concept of the creative self, Adler rejected the very foundation of Freud's psychoanalysis—repressed memories of traumatic experiences. Adler said, "We do not suffer the shock of [traumatic experiences] we make out of them just what suits our purposes" (1931/1958, p. 14). Once a worldview, final goals, and a lifestyle are created by an individual, all experiences are interpreted relative to them. As such, Adlerian therapy is often seen as a first step in the direction of Humanistic psychology, which we will consider in the next chapter (Carlson, Watts, & Maniacci, 2006).

Karen Horney

Karen Horney (pronounced "horn-eye"; **1885–1952**) was born Karen Danielson in a small village near Hamburg, Germany. Her father was a Norwegian sea captain, and her mother, who was 18 years younger than the captain, was a member of a prominent Dutch-German family. Karen's father was a God-fearing fundamentalist who believed that women are inferior to men and are the primary source of evil in the world. Karen had conflicting feelings about her father. She disliked him because of the frequent derogatory statements he made about her appearance and intelligence. She liked him because he added adventure to her life by taking her with him on at least three lengthy sea voyages. The family called the father the "Bible thrower" (Rubins, 1978, p. 11) because often, after reading the Bible at length, he would explode in a fit of anger and throw the Bible at his wife. Such experiences caused Karen to develop a negative attitude toward religion and toward authority figures in general. After being treated by a physician when she was age 12, Karen decided she wanted to

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Karen Horney

become a medical doctor. Her decision was supported by her mother and opposed by her father.

In 1906, at the age of 21, Karen entered the medical school at Freiberg, Germany. In October 1909, she married Oskar Horney, a lawyer with whom she eventually had three children (two of whom were psychoanalyzed by Melanie Klein). Horney completed her medical degree at the University of Berlin in 1913, where she was an outstanding student. She then received psychoanalytic training at the Berlin Psychoanalytic Institute, where she was psychoanalyzed first by Karl Abraham and then by Hans Sachs, two of the most prominent Freudian analysts at the time (and both members of Freud's inner circle). In 1918, at the age of 33, she became a practicing analyst; from that time until 1932, she taught at the Berlin Psychoanalytic Institute and also maintained a private practice.

In 1932 Horney accepted an invitation from the prominent analyst Franz Alexander to come to the United States to become an associate director of the newly founded Chicago Institute of Psychoanalysis. Two years later, she moved to New York, where she trained analysts at the New York Psychoanalytic Institute and established a private practice. It was during this time that major differences between her views and those of the traditional Freudians became apparent. Because of these differences, the theses submitted by her students were routinely rejected, and eventually her teaching duties were restricted. In 1941 she resigned from the New York Psychoanalytic Institute; shortly afterward, she founded her own organization called the American Institute for Psychoanalysis, where she continued to develop her own ideas until her death in 1952.

General Disagreement with Freudian Theory. Horney believed that Freudian notions such as unconscious sexual motivation, the Oedipal complex, and the division of the mind into an id, ego, and superego may have been appropriate in Freud's cultural setting and at his time in history but that they had little relevance for problems experienced by people during the Depression years in the United States. Like Adler, she found that the problems that her clients were having had to do with losing their jobs and not having enough money to pay the rent, buy food, or provide their families with adequate medical care. She rarely found unconscious sexual conflicts to be the cause of a client's problem. Horney reached the conclusion that what a person experiences socially determines whether he or she will have psychological problems, and not the intra-psychic conflict (among the id, ego, and superego) that Freud had described. For Horney, the causes of mental illness are to be found in society and in social interactions, and it is therefore those factors that need to be addressed in the therapeutic process.

Horney (1937) elaborated her view that psychological problems are caused by disturbed human relationships, and of these relationships, those between the parents and the child are most important. She believed that every child has two basic needs: to be safe from pain, danger, and fear and to have biological needs satisfied. Two possibilities exist: the parents can consistently and lovingly satisfy the child's needs, or the parents can demonstrate indifference, inconsistency, or even hatred toward the child. If the former occurs, the child is well on the way to becoming a normal, healthy adult. If the latter occurs, the child is said to have experienced the basic evil and is well on the way to becoming a neurotic.

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A child experiencing some form of the basic evil develops **basic hostility** toward the parents. Because the parent–child relationship is so basic to a child, the hostility he or she feels develops into a worldview. That is, the world is viewed as a dangerous, unpredictable place. However, because the child is in no position to aggress toward the parents or the world, the basic hostility felt toward them must be repressed. When basic hostility is repressed, it becomes **basic anxiety**. Basic anxiety is the "all-pervading feeling of being lonely and helpless in a hostile world" (Horney, 1937, p. 77), and it is the prerequisite for the development of neurosis.

Alone and helpless in a hostile world, the person experiencing basic anxiety must find a way to cope with such feelings. Horney (1945) described three major adjustment patterns available to neurotic individuals, that is, those with basic anxiety. One adjustment is **moving toward people**, thus becoming the *compliant type*. The compliant type seems to be saying, "If I give in, I shall not be hurt" (Horney, 1937, p. 83).

> In sum, this type needs to be liked, wanted, desired, loved; to feel accepted, welcomed, approved of, appreciated; to be needed, to be of importance to others, especially to one particular person; to be helped, protected, taken care of, guided. (Horney, 1945, p. 51)

A second major adjustment pattern is **moving against people**, thus becoming the *hostile type*. The hostile type seems to be saying, "If I have power, no one can hurt me" (Horney, 1937, p. 84).

> Any situation or relationship is looked at from the standpoint of "What can I get out of it?"—whether it has to do with money, prestige, contacts, or ideas. The person himself is consciously or semiconsciously convinced that everyone acts this way, and so what counts is to do it more efficiently than the rest. (Horney, 1945, p. 65)

The third major adjustment pattern is **moving away from people**, thus becoming the *detached type*. The detached type seems to be saying, "If I withdraw, nothing can hurt me" (Horney, 1937, p. 85).

> What is crucial is their inner need to put emotional distance between themselves and others. More accurately, it is their conscious and unconscious determination not to get emotionally involved with others in any way, whether in love, fight, co-operation, or competition. They draw around themselves a kind of magic circle which no one may penetrate. (Horney, 1945, p. 75)

Horney believed that psychologically healthy individuals use all three adjustment patterns as circumstances warrant. Neurotics, however, use only one pattern and attempt to use it to deal with all of life's eventualities. Interestingly, extensions of Horney's work can also be found in the area of management, where these concepts are applied to problematic leadership styles.

Feminine Psychology. Chodorow (1989) recognizes Horney as the first psychoanalytic feminist. Horney agreed with Freud's contention that anatomy is destiny—that is, that one's major personality traits are determined by gender. However, in her version of this contention, it is males who envy female anatomy rather than the other way around:

> From the biological point of view woman has in motherhood, or in the capacity for motherhood, a quite indisputable and by no means negligible physiological superiority. This is most clearly reflected in the unconscious of the male psyche in the boy's intense envy of motherhood.… When one begins, as I did, to analyze men only after a fairly long experience of analyzing women, one receives a most surprising impression of the intensity of this envy of pregnancy, childbirth, and motherhood, as well as of the breasts and of the act of suckling. (Horney & Kelman, 1967, pp. 60–61)

In the end, Horney's position was that personality traits are determined more by cultural than by biological factors (Paris, 2000). As early as 1923,

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Horney began writing articles on how culture influences female personality development, and these articles have been compiled in *Feminine Psychology* (Horney & Kelman, 1967). Horney agreed with Freud that women often feel inferior to men, but, to her, this feeling has nothing to do with penis envy. According to Horney, women are indeed inferior to men, but they are culturally, not biologically, inferior. Horney described how cultural stereotypes hold women back:

> Woman's efforts to achieve independence and an enlargement of her field of interests and activities are continually met with skepticism which insists that such efforts should be made only in the face of economic necessity, and that they run counter to her inherent character and her natural tendencies. Accordingly, all efforts of this sort are said to be without any vital significance for woman, whose every thought, in point of fact, should center exclusively upon the male or upon motherhood. (Horney & Kelman, 1967, p. 182)

When women appear to wish to be masculine, what they are really seeking is cultural equality. Because culture is a masculine product, one way to gain power in culture is to become masculine: "Our whole civilization is a masculine civilization. The State, the laws, morality, religion, and the sciences are the creation of men" (Horney & Kelman, 1967, p. 55). And,

> The wish to be a man … may be the expression of a wish for all those qualities or privileges which in our culture are regarded as masculine, such as strength, courage, independence, success, sexual freedom, right to choose a partner. (1939, p. 108)

Horney agreed with Freud on the importance of early childhood experiences and unconscious motivation but disagreed with his emphasis on biological motivation, stressing cultural motivation instead. As far as the therapeutic process is concerned, Horney used free association and dream analysis and believed transference and resistance provided important information. She was much more optimistic about people's ability to change their personalities than Freud was, and, unlike Freud, she believed people could solve many of their own problems. Horney's book *Self-Analysis* (1942/1968) was one of the first self-help books in psychology, and it was controversial. One reason for the controversy was Freud's contention that all analysts had to be psychoanalyzed before being qualified to treat patients.

In conclusion, we can see that Freudian theory strongly influenced Horney who accepted much of it. However, she ended up disagreeing with almost every conclusion that Freud had reached about women. Because Freud's was the first comprehensive effort to explain personality and his was the first comprehensive attempt to understand and treat individuals with mental illness, all subsequent theories of personality and therapeutic techniques owe a debt to him. One of the greatest tributes to Freud is the number of prominent individuals he influenced, and we have discussed only a small sample. For a more extensive sampling, see Roazen (1992).

SUMMARY

Although most, if not all, of the conceptions that would later characterize psychoanalysis were part of Freud's philosophical and scientific heritage, his significant accomplishment was to take those disparate conceptions and synthesize them into a comprehensive theory of personality. Although Freud originally tried to explain hysteria as a physiological problem, events led him to attempt a psychological explanation of hysteria instead. Freud learned from Breuer that when Breuer's patient Anna O. was totally relaxed or hypnotized and then asked to remember the circumstances under which one of her many symptoms had first occurred, the symptom would at least temporarily disappear. This type

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of treatment was called the cathartic method. Freud also learned from Breuer's work with Anna O. that the therapist was sometimes responded to as if he were a relevant person in the patient's life, a process called transference. Sometimes the therapist also became emotionally involved with a patient, a process called countertransference. *Studies on Hysteria* (1895/1955), the book that Freud coauthored with Breuer, is usually taken as the formal beginning of the school of psychoanalysis. From his visit with Charcot, Freud learned that hysteria is a real disorder that occurs in both males and females, that ideas dissociated from consciousness by trauma could trigger bodily symptoms in those inherently predisposed to hysteria, and that the symptoms of hysteria may have a sexual origin.

Soon after Freud began treating hysterical patients, he used hypnosis but found that he could not hypnotize some patients and that the ones he could hypnotize received only temporary relief from their symptoms. He also found that patients often refused to believe what they had revealed under hypnosis and therefore could not benefit from a rational discussion of previously repressed material. After experimenting with various other techniques, Freud finally settled on free association, whereby he encouraged his patients to say whatever came to their minds without inhibiting any thoughts. By analyzing a patient's symptoms and by carefully scrutinizing a patient's free associations, Freud originally believed that hysteria results from a childhood sexual seduction but later concluded that the seductions he had discovered were usually patient fantasies.

During his self-analysis, Freud found that dreams contain the same clues concerning the origins of a psychological problem as did physical symptoms or free associations. He distinguished between the manifest content of a dream, or what the dream appears to be about, and the latent content, or what the dream is actually about. Freud believed that the latent content represents wish fulfillments that a person could not entertain consciously without experiencing anxiety. Dream work disguises the true meaning of a dream. Examples of dream work include condensation, in which several things from a person's life are condensed into one symbol, and displacement, in which a person dreams about something symbolically related to an anxiety-provoking object, person, or event instead of dreaming about whatever it is that actually provokes the anxiety.

According to Freud, the adult mind consists of an id, an ego, and a superego. The id is entirely unconscious and demands immediate gratification; it is therefore said to be governed by the pleasure principle. The ego's job is to find real objects in the environment that can satisfy needs; it is therefore said to be governed by the reality principle. The realistic processes of the ego are referred to as secondary in order to distinguish them from the irrational primary processes of the id. The third component of the mind is the superego, which consists of the conscience, or the internalization of the experiences for which a child had been punished, and the ego-ideal, or the internalization of the experiences for which a child had been rewarded.

Freud distinguished among objective anxiety, the fear of environmental events; neurotic anxiety, the feeling that one is about to be overwhelmed by one's id; and moral anxiety, the feeling caused by violating one or more internalized values. One of the major jobs of the ego is to reduce or eliminate anxiety; to accomplish this, the ego employs the ego defense mechanisms. All defense mechanisms depend on repression, which is the holding of disturbing thoughts in the unconscious. Other ego defense mechanisms are displacement, sublimation, projection, identification, rationalization, and reaction formation.

During the psychosexual stages of development, the erogenous zone, or the area of the body associated with the greatest amount of pleasure, changes. Freud named the stages of development in terms of their erogenous zones. During the oral stage, either overgratification or undergratification of the oral needs results in a fixation. Fixation during the anal stage results in the adult being either an anal-expulsive or an anal-retentive character. During the phallic stage, the male and female Oedipal complexes occur. Freud believed the psychology of males and females to be qualitatively different, primarily because of differential Oedipal experiences.

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The latency stage is characterized by repression of sexual desires and sublimation. During the genital stage, the person emerges possessing the personality traits that experiences during the preceding stages have molded.

Freud found considerable evidence for his theory in everyday life. He felt that forgetting, losing things, accidents, and slips of the tongue were often unconsciously motivated. He also thought jokes provide information about repressed experience because people tend to find anxiety-provoking material humorous. Freud believed that although we share the instinctual makeup of other animals, humans have the capacity to understand and harness instinctual impulses by exercising rational thought. Freud was especially critical of religion, believing that it is an illusion that keeps people functioning on an infantile level. His hope was that people would embrace the principles of science, thereby becoming more objective about themselves and the world.

In recent years, there have been efforts to correct several misconceptions about Freud and psychoanalysis. Some historians have argued that Freud was not the courageous, innovative hero that he and his followers portrayed him to be, and that his ideas were not as original as he and his followers claimed. Several current scholars and researchers suggest that Freud entered the therapeutic situation assuming that repressed childhood sexual trauma was the cause of a patient's disorder. Others, such as Loftus, question the very existence of repressed memories. Freud has also been criticized for overemphasizing sexual motivation, and creating a method of therapy that is too long and costly to be useful to most people. Also, Freud's theory violates Popper's principle of falsifiability.

Anna Freud became the spokesperson for psychoanalysis after her father died. She also applied psychoanalysis to children, which brought her into conflict with Melanie Klein, who had distinctly different ideas about child analysis. In her analysis of children, Anna Freud's approach to understanding children emphasized ego functions and her interest in ego psychology was further demonstrated by her analysis of the ego defense mechanisms. One of her followers was Erik Erikson who developed a life-span model of development. Other psychoanalytic researchers in development included Bowlby and Ainsworth, best known for their study of infant attachment styles.

Jung, an early follower of Freud, eventually broke with him. Jung saw the libido as a pool of energy that could be used for positive growth throughout one's lifetime. Jung distinguished between the personal unconscious, which consists of experiences from one's lifetime of which a person is not conscious, and the collective unconscious, which represents the recording of universal human experience. According to Jung, the collective unconscious contains archetypes, or predispositions, to respond emotionally to certain experiences in one's life and to create myths about them. Among the more fully developed archetypes are the persona, the anima, the animus, the shadow, and the self. Jung distinguished between the attitudes of introversion and extroversion. He also believed that synchronicity, or meaningful coincidence, plays a major role in determining one's course of life. Jung assumed that dreams give expression to the parts of the personality that are not given adequate expression in one's life.

Like Jung, Adler was an early follower of Freud who eventually went his own way. The theory Adler developed was distinctly different from the theories of both Freud and Jung. Adler believed that all humans begin life feeling inferior because of infant helplessness. Adler also believed that most people develop a lifestyle that allows them to gain power or approach perfection and thereby overcome their feelings of inferiority. Some people, however, are overwhelmed by their feelings of inferiority and develop an inferiority complex. Influenced by Vaihinger's philosophy of "as if," Adler believed that the only meaning in life is the meaning created by the individual. Out of its earliest experiences, a child creates a worldview.

Horney was trained as a Freudian analyst but eventually developed her own theory. She believed that psychological problems result more from societal conditions and interpersonal relationships than from sexual conflicts. Among interpersonal relationships, that between parent and child is most important. Horney believed that there were two types of parent–child relationships: one that consistently and lovingly satisfies the child's biological and safety needs and one that frustrates those needs. When basic hostility is repressed, it becomes basic anxiety, which is the feeling of being alone and helpless in a hostile world. A child experiencing basic anxiety typically uses one of three major adjustment patterns with which to embrace reality: Moving toward people emphasizes love, moving against people emphasizes hostility, and moving away from people emphasizes withdrawal. Normal people use all three adjustment techniques as they are required, whereas neurotics attempt to cope with all of life's experiences using just one.

Horney modified Freud's contention that anatomy is destiny, saying instead that gender differences in personality are culturally determined. She said that women often feel inferior to men because they are often culturally inferior. In her practice, Horney found that it was males who were envious of female biology rather than the reverse. Horney contended that psychoanalysis seemed more appropriate and complimentary to males because it was created by males. Although in her practice of psychoanalysis Horney used a number of Freudian concepts and techniques, she was more optimistic in her prognosis for personality change than was Freud.

DISCUSSION QUESTIONS

1. Provide evidence that many components of what was to become psychoanalysis were part of Freud's philosophical or scientific heritage.
2. Briefly define the terms *catharsis*, *transference*, and *countertransference*.
3. What was the significance of Freud's visit with Charcot for the development of psychoanalysis?
4. What did Freud learn from Liebeault and Bernheim at the Nancy school of hypnosis that influenced the development of psychoanalysis?
5. What did Freud mean when he said that *true* psychoanalysis began only after hypnosis had been discarded?
6. What was Freud's seduction theory? What did Freud conclude his mistake regarding the seduction theory had been?
7. Explain the significance of dream analysis for Freud. What is the difference between the manifest and the latent content of a dream? What is meant by dream work?
8. What is the Oedipus complex, and what is its significance in Freud's theory?
9. Define the term *parapraxes* and show its importance to Freud's contention that much everyday behavior is unconsciously motivated.
10. Give an example showing the interactions among the id, the ego, and the superego.
11. Why did Freud feel the need to postulate the existence of a death instinct? What types of behavior did this instinct explain?
12. What, according to Freud, is the function of the ego defense mechanisms? Why is repression considered the most basic ego defense mechanism? Explain what Freud meant when he said that civilization is built on sublimation.
13. What was Freud's view of human nature? Religion? What was his hope for humankind?
14. Why do researchers, such as Loftus, question the existence of repressed memories?
15. Summarize the major criticisms and contributions of Freud's theory.
16. What were Anna Freud's contributions to psychoanalysis? Why is she considered a pioneer of ego psychology?
17. Define the following terms from Jung's theory: *collective unconscious*, *archetype*, *persona*, *anima*, *animus*, *shadow*, and *self*.

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18. Define the following terms from Adler's theory: *compensation*, *feelings of inferiority*, *inferiority complex*, *worldview*, *guiding fiction*, *lifestyle*, and *social interest*.
19. Summarize the main differences between Freud's and Adler's theories of personality.
20. In what way(s) did Vaihinger's philosophy of "as if" influence Adler's theory of personality? How does Adler's theory relate to Nietzsche?
21. According to Horney, what are the three major adjustment patterns that neurotics can use while interacting with people? How does the way normal people use these patterns differ from the way neurotics use them?
22. Did Horney agree with Freud's contention that anatomy is destiny? Why, according to Horney, do women sometimes feel inferior to men?

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GLOSSARY

Adler, Alfred (1870–1937) An early follower of Freud who left the Freudian camp and created his own theory of personality, which emphasized the conscious mind and the individual creation of a worldview, guiding fictions, and a lifestyle in order to overcome feelings of inferiority and to seek perfection.

Altruistic surrender An ego defense mechanism, postulated by Anna Freud, whereby a person avoids personal anxiety by vicariously living the life of another person.

Anxiety The feeling of impending danger. Freud distinguished three types of anxiety: objective anxiety, which is caused by a physical danger; neurotic anxiety, which is caused by the feeling that one is going to be overwhelmed by his or her id; and moral anxiety, which is caused by violating one or more values internalized in the superego.

Archetype According to Jung, an inherited predisposition to respond emotionally to certain categories of experience.

Basic anxiety According to Horney, the feeling of being alone and helpless in a hostile world that a child experiences when he or she represses basic hostility. (*See also* **Basic hostility**.)

Basic hostility According to Horney, the feeling of anger that a child experiences when he or she experiences the basic evil.

Breuer, Josef (1842–1925) The person Freud credited with the founding of psychoanalysis. Breuer discovered that when the memory of a traumatic event is recalled under deep relaxation or hypnosis, there is a release of emotional energy (catharsis) and the symptoms caused by the repressed memory are relieved.

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Cathartic method The alleviation of hysterical symptoms by allowing pathogenic ideas to be expressed consciously.

Collective unconscious Jung's term for the part of the unconscious mind that reflects universal human experience through the ages. For Jung the collective unconscious is the most powerful component of the personality.

Compensation According to Adler, the making up for a weakness by developing strengths in other areas.

Condensation The type of dream work that causes several people, objects, or events to be condensed into one dream symbol.

Countertransference The process by which a therapist becomes emotionally involved with a patient.

Creative self According to Adler, the component of the personality that provides humans with the freedom to choose their own destinies.

Death instinct The instinct that has death as its goal (sometimes called the death wish).

Developmental lines A concept introduced by Anna Freud describing the major adjustments that typify the transition between childhood and adolescence and young adulthood.

Displacement The ego defense mechanism by which a goal that does not provoke anxiety is substituted for one that does. Also, the type of dream work that causes the dreamer to dream of something symbolically related to anxiety-provoking events rather than dreaming about the anxiety-provoking events themselves.

Dream analysis A major tool that Freud used in studying the contents of the unconscious mind. Freud thought that the symbols dreams contain could yield information about repressed memories, just as hysterical symptoms could. For Jung dreams provided a mechanism by which inhibited parts of the psyche might be given expression. Therefore, for Jung, dream analysis indicated which aspects of the psyche are underdeveloped.

Dream work The mechanism that distorts the meaning of a dream, thereby making it more tolerable to the dreamer. (*See also* **Condensation** and **Displacement**.)

Ego According to Freud, the component of the personality that is responsible for locating events in the environment that will satisfy the needs of the id without violating the values of the superego.

Ego Derived from Freud's use of the term, according to Jung, that aspect of the psyche responsible for problem solving, remembering, and perceiving.

Ego defense mechanisms The strategies available to the ego for distorting the anxiety-provoking aspects of reality, thus making them more tolerable.

Ego psychology Psychology that emphasizes the autonomous functions of the ego and minimizes the conflicts among the ego, id, and superego.

Erikson, Erik (1902-1994) A psychoanalyst best known for his stage theory of life span development and his psychological biographies.

Extroversion According to Jung, the attitude toward life that is characterized by gregariousness and a willingness to take risks.

Feelings of inferiority According to Adler, those feelings that all humans try to escape by becoming powerful or superior.

Free association Freud's major tool for studying the contents of the unconscious mind. With free association, a patient is encouraged to express freely everything that comes to his or her mind.

Freud, Anna (1895–1982) Became the official spokesperson for psychoanalysis after her father's death. In addition to perpetuating traditional psychoanalytic concepts, she extended them into new areas such as child psychology, education, and child rearing. By elaborating on autonomous ego functions, she encouraged the development of ego psychology. (*See also* **Ego psychology**.)

Freud, Sigmund (1856–1939) The founder of psychoanalysis, a school of psychology that stresses the conflict between the animalistic impulses possessed by humans and the human desire to live in a civilized society.

Horney, Karen (1885–1952) Trained in the Freudian tradition, she later broke away from the Freudians and created her own theory of mental disorders that emphasized cultural rather than biological (such as sexual) causes.

Id According to Freud, the powerful, entirely unconscious portion of the personality that contains all instincts and is therefore the driving force for the entire personality.

Identification with the aggressor An ego defense mechanism, postulated by Anna Freud, whereby the fear caused by a person is reduced by adopting the feared person's values.

Inferiority complex According to Adler, the condition one experiences when overwhelmed by feelings of inferiority instead of being motivated toward success by those feelings.

Instincts According to Freud, the motivational forces behind personality. Each instinct has a source, which is a

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bodily deficiency of some type; an aim of removing the deficiency; an object, which is anything capable of removing the deficiency; and an impetus, which is a driving force whose strength is determined by the magnitude of the deficiency.

Introversion According to Jung, the attitude toward life that is characterized by social isolation and an introspective nature.

Jung, Carl (1875–1961) An early follower of Freud who eventually broke with him because of Freud's emphasis on sexual motivation. Jung developed his own theory, which emphasized the collective unconscious and self-actualization.

Klein, Melanie (1882–1960) An early child analyst whose theory emphasized the importance of the mother–child relationship and the development of the superego during the oral stage of development. By using play therapy, Klein believed that child analysis could begin as early as two years of age. Klein's ideas concerning the psychology of children were often in conflict with those of Anna Freud.

Latent content What a dream is *actually* about.

Libido For Freud, the collective energy associated with the life instincts. For Jung, the creative life force that provides the energy for personal growth.

Lifestyle According to Adler, the way of life that a person chooses to implement the life's goals derived from his or her worldview.

Manifest content What a dream *appears* to be about.

Moving against people The neurotic adjustment pattern suggested by Horney by which people adjust to a world perceived as hostile by gaining power over people and events.

Moving away from people The neurotic adjustment pattern suggested by Horney by which people adjust to a world perceived as hostile by creating a distance between themselves and the people and events in that world.

Moving toward people The neurotic adjustment pattern suggested by Horney by which people adjust to a world perceived as hostile by being compliant.

Oedipus complex The situation that, according to Freud, typically manifests itself during the phallic stage of psychosexual development, whereby children sexually desire the parent of the opposite sex and are hostile toward the parent of the same sex.

Overcompensation According to Adler, the conversion of a weakness into a strength.

Overdetermination Freud's observation that behavioral and psychological phenomena often have two or more causes.

Parapraxes Relatively minor errors in everyday living such as losing and forgetting things, slips of the tongue, mistakes in writing, and small accidents. Freud believed that such errors are often unconsciously motivated.

Pathogenic ideas Ideas that cause physical disorders.

Personal unconscious Jung's term for the place that stores material from one's lifetime of which one is currently not conscious.

Repression The holding of traumatic memories in the unconscious mind because pondering them consciously would cause too much anxiety.

Resistance The tendency for patients to inhibit the recollection of traumatic experiences.

Seduction theory Freud's contention that hysteria is caused by a sexual attack: Someone familiar to or related to the hysteric patient had attacked him or her when the patient was a young child. Freud later concluded that in most cases such attacks are imagined rather than real.

Social interest The concern for other humans and for society that Adler believed characterizes a healthy lifestyle.

Studies on Hysteria The book Breuer and Freud published in 1895 that is usually viewed as marking the formal beginning of the school of psychoanalysis.

Superego According to Freud, the internalized values that act as a guide for a person's conduct.

Synchronicity According to Jung, what occurs when unrelated events converge in a person's life in a meaningful way.

Transference The process by which a patient responds to the therapist as if the therapist were a relevant person in the patient's life.

Unconscious motivation The causes of our behavior of which we are unaware.

Wish fulfillment In an effort to satisfy bodily needs, the id conjures up images of objects or events that will satisfy those needs.

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17

Humanistic (Third-Force) Psychology

THE MIND, THE BODY, AND THE SPIRIT

Generally speaking, we can divide human nature into three major components: the mind (our intellect), the body (our biological makeup), and the spirit (our emotional makeup). Various philosophies and, more recently, schools of psychology have tended to emphasize one of these aspects more than the others. Which philosophy or school of psychology prevailed at any given moment has often been closely tied to the larger Zeitgeist. The decade of the 1960s was a particularly troubled time in the United States. The unpopular Vietnam War accelerated along with its corresponding antiwar movement; assassinations felled John F. Kennedy, Robert Kennedy, and Martin Luther King Jr.; and violent, racial protests occurred in a number of major cities. "Hippies" and college students were in open rebellion against the values of their parents and their nation. Like the ancient Skeptics, they found little worth believing in, and like the ancient Cynics, they dropped out of society and sought a simpler natural life. This Age of Aquarius was clearly not a time when traditional rational philosophy (with emphasis on the mind) or empirical philosophy (with emphasis on the body) was appealing.

By the mid-20th century, structuralism disappeared as a school, and functionalism and Gestalt psychology had lost their distinctiveness as schools by being assimilated into other viewpoints. In the 1950s and early 1960s, only behaviorism and psychoanalysis remained as influential, intact schools of thought. In the troubled times described above, many saw the knowledge of humans provided by behaviorism and psychoanalysis as incomplete, distorted, or both. Needed was a new view of psychology, one that emphasized neither the mind nor the body but the human spirit.

In the early 1960s, a group of psychologists headed by Abraham Maslow started a movement referred to as **third-force psychology**. These psychologists claimed that the other two forces in psychology, behaviorism and psychoanalysis, neglected a number of important human attributes. They said that by applying the techniques used by the natural sciences to the study of humans, behaviorism likened humans to robots, lower animals, or computers. For the behaviorist, there was nothing unique about humans. The major argument against psychoanalysis was that it concentrated mainly on emotionally disturbed people and on developing techniques for making abnormal people normal. What was missing, according to third-force psychologists, was information that would help already healthy individuals become healthier—that is, to reach their full potential. What was needed was a model of humans that emphasized their uniqueness and their positive aspects rather than their negative aspects, and it was this type of model that third-force psychologists attempted to provide.

Although third-force psychology became very popular during the 1960s and 1970s, its popularity began to wane in the 1980s. Nevertheless, like behaviorism and psychoanalysis, third-force psychology remains influential in contemporary psychology. Third-force psychology contrasts vividly with other approaches because it is not deterministic in explaining human behavior. Rather, it assumes that humans are free to choose their own type of existence. Instead of attributing the causes of behavior to stimuli, drive states, genetics, or early experience, third-force psychologists claim that the most important cause of behavior is **subjective reality**. Because these psychologists do not assume determinism, they are not practicing science in the traditional sense, and they make no apology for that. Science in its present form, they say, is not equipped to study, explain, or understand human nature. A new science is needed, a human science.

ANTECEDENTS OF THIRD-FORCE PSYCHOLOGY

Like almost everything else in modern psychology, third-force psychology is not "new." We can readily trace it from the philosophies of romanticism and existentialism.

Also, in Chapter 7, we saw that the romantics (such as Rousseau) insisted that humans are more than machines, which was how the empiricists and sensationalists described them, and more than just logical, rational beings, which was how rationalists described them. Like the ancient Cynics, the romantics distrusted reason, religious dogma, science, and societal laws as guides for human conduct. For them, the only valid guide for a person's behavior was that person's honest feelings. The romantics (especially Rousseau) believed that humans are naturally good and gregarious, and if given freedom they would become happy, fulfilled, and social-minded. That is, given freedom, people would do what was best for themselves and for others. If people acted in self-destructive or antisocial ways, it was because their natural impulses had been interfered with by societal forces. People can never be bad, but social systems can be and often are. Also in Chapter 7, we saw that the existentialists (such as Kierkegaard and Nietzsche) emphasized the importance of meaning in human existence and the human ability to choose that meaning; this, too, is contrary to the philosophies of empiricism and rationalism. For Kierkegaard subjectivity is truth. That is, it is a person's beliefs that guide his or her life and determine the nature of his or her existence. Truth is not something external to the person waiting to be discovered by logical, rational thought processes; it is inside each person and is, in fact, created by each person. According to Nietzsche, God is dead, and therefore humans are on their own. People can take two approaches to life: they can accept conventional morality as a guide for living, thus participating in herd conformity; or they can experiment with beliefs, values, and life and arrive at their own truths and morality—thus becoming supermen. Nietzsche clearly encouraged people to do the latter.

Third-force psychology combines the philosophies of romanticism and existentialism, and this combination is often called humanistic psychology. Third-force and humanistic psychology, then, are the same, but humanistic psychology is now the preferred label. In applying this label, however, it is important not to confuse the term *humanistic* with the terms *human*, *humane*, or *humanitarian*.

> The frequent confusion of the terms *human*, *humane*, and *humanistic* indicates that many do not clearly understand the meaning of the humanistic stance. To qualify as humanistic, it is not enough to concern human beings. Playing, working, building, traveling, organizing, are all *human* activities. This, however, does not make them humanistic. Similarly, when these activities are performed, for instance, for charitable or philanthropic purposes, they are then raised to a humane or *humanitarian* status, which may be of vital importance but still does not make them humanistic. For an endeavor or a viewpoint to qualify properly as humanistic, it must imply and focus upon a certain concept of man—a concept that recognizes his status as a person, irreducible to more elementary levels, and his unique worth as a being potentially capable of autonomous judgment and action. A pertinent example of the difference between the humane and the humanistic outlook is found in the case of behavior control that relies entirely upon positive reinforcement. Such an approach is humane (or humanitarian), since it implements generous and compassionate attitudes. But it is not humanistic, because the rationale behind systematic behavior modification by purely external forces is incompatible with a concept of man as a self- purposive and proactive, rather than merely reactive, being.
>
> The focus of humanistic psychology is upon the specificity of man, upon that which sets him apart from all other species. It differs from other psychologies because it views man not solely as a biological organism modified by experience and culture but as a person, a symbolic entity capable of pondering his existence, of lending it meaning and direction. (Kinget, 1975, p. v)

Phenomenology

Throughout this text, we have referred to a variety of methodologies as phenomenological. In its most general form, **phenomenology** refers to any methodology that focuses on experience as it occurs, without attempting to reduce that experience to its component parts. Thus, one can study consciousness without being a phenomenologist, as was the case when Wundt and Titchener attempted to reduce conscious experience to its basic elements. After making this distinction, however, phenomenology can take many forms. The phenomenology of Johann Goethe and Ernst Mach focused on complex sensations including afterimages and illusions. The phenomenology of Franz Brentano (1838–1917) and his colleagues focused on psychological acts such as judging, recollecting, expecting, doubting, fearing, hoping, or loving. As we saw in Chapter 9, in Brentano's brand of phenomenology, the concept of **intentionality** was extremely important. Brentano believed that every mental act refers to (intends) something outside itself—for example, "I see a tree," "I like my mother," or "That was a good piece of pie." The contents of a mental act could be real or imagined, but the act, according to Brentano, always refers to (intends) something. In Chapter 14, we saw how Brentano's (and Husserl's) phenomenology influenced the Gestalt psychologists. Next, we will see how phenomenology was instrumental in the development of modern existentialism.

The goal of Edmund Husserl (Chapter 9) was to take the type of phenomenology Brentano described and use it to create an objective, rigorous basis for philosophical and scientific inquiry. Like Brentano, Husserl believed that phenomenology could be used to create an objective bridge between the outer, physical world and the inner, subjective world. Of prime importance to Husserl was that phenomenology be free of any preconceptions. That is, Husserl believed in reporting exactly what

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appears in consciousness, not what *should* be there according to some belief, theory, or model.

As we saw in Chapter 9, however, Husserl believed that phenomenology could go beyond an analysis of intentionality. A study of intentionality determined how the mind and the physical world interact, and such a study is essential for the physical sciences. But, in addition to an analysis of intentionality, Husserl proposed a type of phenomenology that concentrates on the workings of the mind that are independent of the physical world. Husserl called this **pure phenomenology**, and its purpose was to discover the essence of conscious experience. Whereas the type of phenomenology that focuses on intentionality involves the person turned outward, pure phenomenology involves the person turned inward. The goal of the latter is to accurately catalog all mental acts and processes by which we interact with environmental objects or events. Husserl believed that an inventory of such acts and processes had to precede any adequate philosophy, science, or psychology because it is those mental acts and processes on which all human knowledge is based.

Husserl's pure phenomenology soon expanded into modern existentialism. Whereas Husserl was mainly interested in epistemology and in the essence of mental phenomena, the existentialists were interested in the nature of human existence. In philosophy, **ontology** is the study of existence, or what it means to be. The existentialists are concerned with two ontological questions: (1) What is the nature of human nature? and (2) What does it mean to be a particular individual? Thus, the existentialists use phenomenology to study either the important experiences that humans have in common or those experiences that individuals have as they live their lives—experiences such as fear, dread, freedom, love, hate, responsibility, guilt, wonder, hope, and despair.

Husserl's phenomenology was converted into existential psychology mainly by his student Martin Heidegger, who we will consider subsequently. But Husserl's approach was not the only convergence of phenomenology and existentialism. **Maurice Merleau-Ponty (1908–1961)** was among the most important voices in French psychology following World War II.

Merleau-Ponty's doctorate was based on two books first published during the war (although not translated into English until the 1960s). *The Structure of Behavior* offered a careful review and detailed criticism of Watson's behavioral approach to psychology, and then the *Phenomenology of Perception* outlined his existential-phenomenological alternative. Although strongly influenced by Husserl, Merleau-Ponty also built on the works of William James and the Gestalt psychologists (Schmidt, 1985). As a professor of child psychology and pedagogy at the Sorbonne, Merleau-Ponty remained more grounded within academic psychology than most of the other thinkers we will consider in this chapter. Indeed, although much of what we will consider in this chapter is focused on clinical psychology, there are academic psychologists today that apply phenomenological methods (often Merleau-Ponty's methods) to topics across the landscape of psychology (see for examples, Giorgi, 1970, 1989; Pollio, Henley, & Thompson, 1997; Valle & King, 1978).

EXISTENTIAL PSYCHOLOGY

Although it is possible to find existential ideas in such early philosophers as Socrates and Augustine, it is traditional to mark the beginning of existential philosophy with the writings of Kierkegaard and Nietzsche. The great Russian novelist, Fyodor Dostoevsky, is also commonly mentioned as among the first existential thinkers. All these individuals probed the meaning of human existence and tried to restore the importance of human feeling, choice, and individuality that had been minimized in rationalistic philosophies, such as those of Kant and Hegel, and in conceptions of people based on Newtonian concepts, such as those proposed by the British empiricists and French sensationalists. A second golden age of existentialism occurs in Europe around the time of World War II.

Jean-Paul Sartre and Albert Camus

Both **Jean-Paul Sartre (1905–1980)** and **Albert Camus (1913–1960)** would win the Nobel Prize in Literature based on their writings in existentialism. Sartre's first novel—*Nausea*—vividly blends ideas from existentialism and Husserlian phenomenology in the form of a fictional biographic. *No Exit*, perhaps his best known work, is a short play set in the lobby of a hotel (or so it would seem). Deeply psychological, the drama culminates with the epiphany expressed by the famed line "Hell is other people." Sartre was extremely interested in the power we let others have over ourselves, and covered this topic by analyzing matters as simple as the transfixing human gaze to complex considerations of political movements. This intersection of social behavior and existentialism was also the focus of Sartre's close friend Simon de Beauvior, one of the pioneers of modern feminist philosophy.

Outside of his fiction, Sartre's other key work is *Being and Nothingness*, his response to Heidegger's classic *Being and Time* which Sartre digested while serving as a prisoner of war. Like Sartre, Albert Camus worked as a writer for the French resistance during part of World War II, and both men would eventually find their fame by writing psychologically-near existential fiction, and in the area of political science. Camus' most famous novellas include *The Stranger* and *The Fall*, both character studies of extremely interesting men. Camus is often associated with the **absurd**, or the existential idea that to search for life's pre-ordained purpose is futile. Like Kierkegaard, Camus believed that it was our task to create meaning, as there are no hidden Truths for us to somehow discover by exploring religion, science, or any established philosophy. Although these ideas are central to all his work, Camus' most academic consideration of absurdity is offered in his essay *The Myth of Sisyphus*, an analysis of the psychology of suicide.

Martin Heidegger

Martin Heidegger (1889–1976) was Husserl's student and then his assistant, and he dedicated the first edition of his famous book *Being and Time* (1927) to Husserl. Heidegger had been chosen by Husserl to replace him as chair at Freiburg, but by the time this occurred, the men were no longer friends. Heidegger's work is generally considered a key bridge between existential philosophy and **existential psychology**. Many, if not most, of the terms and concepts that appear in the writings of current existential psychologists can be traced to the writings of Heidegger. Like Husserl, Heidegger was a phenomenologist; but unlike Husserl, Heidegger used phenomenology to examine the totality of human existence. In 1933 Heidegger became rector at the University of Freiburg. In his inaugural speech titled "The Role of the University in the New Reich," he was highly supportive of the Nazi party. Although Heidegger resigned his rectorship a few months after the Nazis took office, he never took a strong stand against them (Langan, 1961). In fact, Farias (1989) leaves little doubt that Heidegger was committed to Nazism and involved himself in the activities of the Nazi regime. It is ironic that someone with such unfortunate political leanings had such a significant influence on humanistic psychology. Husserl eventually felt betrayed by Heidegger both in terms of his changes to phenomenology, and by his perceived anti-Semitism. Heidegger removed his dedication from the 1941 edition of his masterwork, *Being and Time*.

Dasein. Heidegger used the term **Dasein** to indicate that a person and the world are inseparable. Literally, *Dasein* means "to be" (*sein*) "there" (*Da*), and Heidegger usually described the relationship between a person and the world as "being-in-the-world." A more dramatic way of stating this relationship is to say that without the world humans would not exist, and without humans the world would not exist. The human mind illuminates the physical world and thereby brings it into existence.

But Heidegger's concept of *Dasein* is even more complicated. *To be* means "to exist," and to exist is a

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Martin Heidegger

dynamic process. To exist as a human is to exist unlike anything else. In the process of existing, humans choose, evaluate, accept, reject, and expand. Humans are not static; they are always becoming something other than what they were. To exist is to become different; to exist is to change. How a particular person chooses to exist is an individual matter, but for all people existence is an active process. The *Da*, or there, in *Dasein* refers to that place in space and time where existence takes place; but no matter where and when it takes place, existence (to be) is a complex, dynamic, and uniquely human phenomenon. Unlike anything else in the universe, humans choose the nature of their own existence.

Authenticity and Inauthenticity. It was very significant to Heidegger that humans can ponder the finiteness of their existence. For Heidegger a prerequisite for living an **authentic life** is coming to grips with the fact that "I must someday die." With that realization dealt with, the person can get busy and exercise his or her freedom to create a meaningful existence, an existence that allows for almost constant personal growth, or **becoming**.

Because realizing that one is mortal causes anxiety, however, people often refuse to recognize that fact and thereby inhibit a full understanding of themselves and their possibilities. According to Heidegger, this results in an **inauthentic life**. An authentic life is lived with a sense of excitement or even urgency because one realizes one's existence is finite. With the time that one has available, one must explore life's possibilities and become all that one can become. An inauthentic life does not have the same urgency because the inevitability of death is not accepted. One pretends, and pretending is inauthentic. Other inauthentic modes of existence include living a traditional, conventional life according to the dictates of society and emphasizing present activities without concern for the future. The inauthentic person gives up his or her freedom and lets others make the choices involved in his or her life. In general, the speech and behavior of authentic individuals accurately reflect their inner feelings, whereas with inauthentic individuals this is not the case.

Guilt and Anxiety. Heidegger believed that if we do not exercise our personal freedom, we experience **guilt**. Because most people do not fully exercise their freedom to choose, they experience at least some guilt. All humans can do to minimize guilt is try to live an authentic life—that is, to recognize and live in accordance with their ability to choose their own existence.

Because acceptance of the fact that at some time in the future we will be nothing causes **anxiety**, such acceptance takes courage. Heidegger believed that choosing one's existence rather than conforming to the dictates of society, culture, or someone else also takes courage. And in general, living an authentic life by accepting all conditions of existence and making personal choices means that one must experience anxiety. For Heidegger, anxiety is a necessary part of living an authentic life. One reason for this anxiety is that authentic people are always experimenting with life, always taking chances, and always becoming. Entering the unknown causes part of the anxiety associated with an authentic life.

Another reason that exercising one's freedom in life causes anxiety is that it makes one responsible for the consequences of those choices. The free individual cannot blame God, parents,

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circumstances, genes, or anything else for what he or she becomes. One is responsible for one's own life. Freedom and **responsibility** go hand in hand.

Thrownness. Heidegger did, however, place limits on personal freedom. He said that we are thrown into the Da, or there, of our particular life by circumstances beyond our control. This **thrownness** determines, for example, whether we are male or female, short or tall, attractive or unattractive, rich or poor, American or Russian, the time in human history that we are born, and so on. Thrownness determines the conditions under which we exercise our freedom. According to Heidegger, all humans are free, but the conditions under which that freedom is exercised varies. Thrownness provides the context for one's existence. What Heidegger called thrownness has also been called facticity, referring to the facts that characterize a human existence.

Ludwig Binswanger

Ludwig Binswanger (1881–1966) obtained his medical degree from the University of Zurich in 1907 and then studied psychiatry under Eugen Bleuler and psychoanalysis under Carl Jung. Binswanger was one of the first Freudian psychoanalysts in Switzerland, and he and Freud remained friends throughout their lives. Under the influence of Heidegger, Binswanger applied phenomenology to psychiatry, and later he became an existential analyst. Binswanger's goal was to integrate the writings of Husserl and Heidegger with psychoanalytic theory. Adopting Heidegger's notion of *Dasein*, Binswanger called his approach to psychotherapy **Daseinanalysis**.

Like most existential psychologists, Binswanger emphasized the here-and-now, considering the past or future important only insofar as they manifested themselves in the *present*. To understand and help a person, according to Binswanger, one must learn how that person views his or her life at the moment. Furthermore, the therapist must try to understand the *particular person's* anxieties, fears, values, thought processes, social relations, and personal meanings instead of those notions in general. Each person lives in his or her own private, subjective world, which is not generalizable.

Modes of Existence. Binswanger discussed three different modes of existence to which individuals give meaning through their consciousness. They are the **Umwelt** (the "around world"), the world of things and events; the **Mitwelt** (the "with world"), interactions with other humans; and the **Eigenwel** (the "own world"), a person's private, inner, subjective experience. To understand a person fully, one must understand all three of his or her modes of existence.

One of Binswanger's most important concepts was that of *Weltanschauung*, or **world-design** (worldview). In general, world-design is how an individual views and embraces the world. World-designs can be open or closed, expansive or constructive, positive or negative, simple or complex, or they could have any number of other characteristics. In any case, it is through the world-design that one lives one's life, and therefore the world-design touches everything that one does. If a world-design is ineffective, in the sense that it results in too much anxiety, fear, or guilt, it is the therapist's job to help the client see that there are other ways of embracing the world, other people, and oneself.

Binswanger agreed with Heidegger that thrownness places limits on personal freedom. For Binswanger, the circumstances into which one is thrown determines one's **ground of existence**, defined as the conditions under which one exercises one's personal freedom. However, no matter what a human's circumstances are, he or she aspires to transcend them—that is, not to be victimized or controlled by them. Everyone seeks **being-beyond-the-world**. By "being-beyond-the-world," Binswanger was not referring to a life after death, or anything else supernatural, but to the way in which people try to transform their circumstances by exercising their free will.

Existentialism as Therapy. People may be thrown into negative circumstances such as poverty, incest, rape, or war, but they need not be devastated by those experiences. Most existentialists accept Nietzsche's proclamation: "What does not kill me, makes me stronger" (Nietzsche, 1889/1998b). This strength comes from finding meaning even in a negative experience and growing from that meaning. In his famous book *Man's Search for Meaning* (1946/1984), psychiatrist Viktor E. Frankl (1905–1997) described his experiences in a Nazi concentration camp. One of his major observations was that prisoners who, even under those dire circumstances, found meaning in their lives and something to live for continued to live:

> We who lived in concentration camps can remember the men who walked through the huts comforting others, giving away their last piece of bread. They may have been few in number, but they offer sufficient proof that everything can be taken from a man but one thing: the last of the human freedoms—to choose one's attitude in any given set of circumstances, to choose one's own way. (p. 86)

According to Frankl (1946/1984), "Suffering ceases to be suffering at the moment it finds a meaning" (p. 135).

By choosing, we change the meanings and values of what we experience. Although physical circumstances may be the same for different people, how those circumstances are embraced, interpreted, valued, symbolized, and responded to is a matter of personal choice. By exercising our freedom, we grow as human beings; and because exercising freedom is an unending process, the developmental process is never completed. Becoming characterizes the authentic life, which, in turn, is characterized by anxiety. Not becoming, or remaining stagnant, characterizes the inauthentic life—as does guilt—because the person does not attempt to fully manifest his or her human potential.

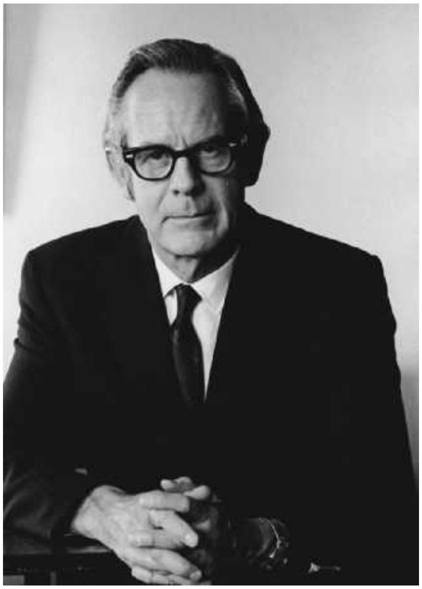
Beyond Binswanger, such ideas would appear in a variety of existential approaches to clinical psychology following World War II. For example, Karl Jaspers (1883–1969) also sought to merge existential philosophy with the practice of psychiatry, and his own analysis of *being-there* mirrors the work of Heidegger and Binswanger in many ways. Initially trained as a physician, Jaspers would spend much of his academic career as a psychologist. Following the war, his writings became increasingly focused on existential philosophy.

Prior to the Holocaust, Frankl had been a psychoanalyst associated with Freud and Adler. After his experience in the war he would reinvent his clinical approach, calling it logotherapy, which he described as a phenomenological analysis of how people come to find meaning. Similarly, Medard Boss (1903–1990), another Swiss psychiatrist previously associated with Blueler, Jung, and Horney, was also a leading popularizer of Daseinanalysis after the war. Boss came to believe that any approach to understanding human nature that was limited to traditional science would be incomplete—a theme we will see time and again among the existential and humanistic thinkers that helped shape American approaches to clinical psychology.

Rollo May

Rollo May (1909–1994) introduced existentialism to U.S. psychology through books he edited, *Existence: A New Dimension in Psychiatry and Psychology* (with Angel & Ellenberger, 1958) and *Existential Psychology* (1961). May was born in Ada, Ohio. Neither of his parents was well educated, and there was little intellectual stimulation in the home. When his older sister became psychotic, his father blamed it on too much education. May was not close to either of his parents, but he especially disliked his mother (Rabinowitz, Good, & Cozad, 1989). May received his Bachelor of Arts degree from Oberlin College in 1930 and a Bachelor of Divinity degree from Union Theological Seminary in 1938. While at the Union Seminary, May met the existential philosopher Paul Tillich (1886–1965), and the two became lifelong friends. In 1973 May wrote *Paulus: Reminiscences of a Friendship* as a tribute to Tillich. After graduation, May served as a minister for two years in Montclair, New Jersey. In the 1940s, he studied psychoanalysis at the William Alanson White Institute of Psychiatry, Psychoanalysis, and Psychology, and he became a practicing psychoanalyst in 1946. May enrolled in the doctorate program at Columbia University, but before he obtained his degree, he contracted tuberculosis and nearly died. During this depressing time, May studied Kierkegaard's and Freud's views on anxiety; upon returning to Columbia, he submitted "The Meaning of Anxiety" as his doctoral dissertation. In 1949 May received the first PhD in clinical psychology ever awarded by Columbia University. In modified form, his dissertation became *The Meaning of Anxiety* (1950). May's other books include *Man's Search for Himself* (1953), *Psychology and the Human Dilemma* (1967), *Love and Will* (1969), and *Power and Innocence: A Search for the Sources of Violence* (1972). May died in 1994, of multiple causes.

Like many other existential thinkers, May was strongly influenced by Kierkegaard, who had rejected Hegel's belief that an individual's life had meaning only insofar as it related to the totality of things, which Hegel called the Absolute. Kierkegaard proposed that each person's life is a separate entity with its own self-determined meaning. Again, for Kierkegaard, subjectivity is truth; that is, a person's beliefs define that person's reality.



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Rollo May

The Human Dilemma. May (1967) pointed out that humans are both objects and subjects of experience. We are objects in the sense that we exist physically, and therefore things happen to us. As objects, we are not distinguished from the other physical objects that are studied by the natural sciences. It is as objects that humans are considered by the traditional methods of science—the assumption being that human behavior is caused in much the same way that the behavior of any physical object is caused. Besides being objects, however, we are also subjects. That is, we do not simply *have* experience; we interpret, value, and make choices regarding our experience. We give our experience meaning. This dual aspect of human nature, which May called the **human dilemma**, makes us unique. By *dilemma*, May did not mean an insoluble problem; rather, he meant a paradox of human existence.

Normal and Neurotic Anxiety. May believed, along with the other existentialists, that the most important fact about humans is that they are free. As we have seen, however, freedom does not produce a tranquil life. Freedom carries with it responsibility, uncertainty, and therefore anxiety. The healthy (authentic) person exercises freedom to embrace life fully and to approach his or her full potential. Exercising one's freedom means going beyond what one previously was, ignoring the expectations (roles) for one's behavior that others impose, and therefore often acting contrary to traditions, mores, or conventions. All this causes anxiety, but it is normal, healthy anxiety because it is conducive to personal growth (becoming). **Neurotic anxiety** is not conducive to personal growth because it results from the fear of freedom. The person experiencing neurotic anxiety lives his or her life in such a way that reduces or eliminates personal freedom. Such a person conforms to tradition, religious dogma, the expectations of others, or anything else that reduces his or her need to make personal choices. Kierkegaard called the neurotic's situation **shut-upness**. The neurotic is shut off from himself or herself as well as from other people; he or she has become alienated from his or her true self. **Self-alienation** occurs whenever people accept, as their own, values dictated by society rather than those personally attained. Self-alienation results not only in guilt but also in apathy and despair. The frightening aspects of human freedom and the many ways people attempt to escape from their freedom are discussed in Erich Fromm's classic book *Escape from Freedom* (1941).

According to Kierkegaard, May, and most other existentialists, we can either exercise our free will and experience **normal anxiety** or not exercise it and feel guilty. Obviously, it is not easy being human, for this conflict between anxiety and guilt is a constant theme in human existence: "The conflict is between every human being's need to struggle toward enlarged self-awareness, maturity, freedom and responsibility, and his tendency to remain a child and cling to the protection of parents or parental substitutes" (May, 1953, p. 193).

The Importance of Myth. According to May, myths provide the major vehicle for providing meaning in life: "Myth is a way of making sense in a senseless world. Myths are narrative patterns that give significance to our existence" (1991, p. 15). After a long, illustrious career as a psychoanalyst, May reached the following conclusion about people seeking professional help: "As a practicing psychoanalyst I find that contemporary therapy is almost entirely concerned, when all is surveyed, with the problems of the individual's search for myth" (1991, p. 9). In sympathy with May's conclusion, McAdams and Pals (2006) say, "The process of putting life experience into a meaningful narrative form influences development, coping, and well-being" (p. 210). Because myth is a type of narrative (story), May's observation that effective living depends on effective myths is supported by recently developed "narrative therapy." **Narrative therapy** examines the stories by which people live and understand their lives and the effectiveness of those stories (see, for example, Lieblich, McAdams, & Josselson, 2004; McAdams, 2006; McLeod, 1997; Pennebaker & Seagal, 1999; Singer, 2004; White & Epston, 1990).

In his analysis of myth, May (1991) shows an alignment with Jung: "Individual myths will generally be a variation on some central theme of classical myths.… Myths are archetypal patterns in human consciousness [and therefore] where there is consciousness, there will be myth" (pp. 33, 37).

Like Nietzsche, Freud, and Jung, May believed that positive and negative tendencies coexist in all humans and that the tension between them is the primary source of creativity. For May, it is the **daimonic** that is responsible for great literature, drama, and art, and it is the daimonic that is at the heart of many myths; for example, myths portraying conflicts between good and evil. May (1969) defined the daimonic as

> *any natural function which has the power to take over the whole person.* Sex and eros, anger and rage, and the craving for power are examples. The daimonic can be either creative or destructive and is normally both.… The daimonic is the urge in every being to affirm itself, assert itself, perpetuate and increase itself. The daimonic becomes evil when it usurps the total personality without regard to the integration of that self, or to the unique forms and desires of others and their need for integration. It then appears as excessive aggression, hostility, cruelty—the things about ourselves which horrify us most, and which we repress whenever we can, or more likely, project on others. But these are the reverse side of the same assertion which empowers our creativity. All life is a flux between these two aspects of the daimonic. (p. 123)

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May had little patience with those who portray humans as only good or bad. For him, we are potentially both, and therein lies the dilemma of human existence.

According to May, myths serve four primary functions: They provide a sense of identity, provide a sense of community, support our moral values, and provide a means of dealing with the mysteries of creation. Most important, however, "hunger for myth is a hunger for community.… To be a member of one's community is to share in its myths" (1991, p. 45). For May, then, the best myths are those that encourage a sense of kinship among humans. The myth of the rugged individual, popular for so long in the United States, encourages people to live in isolation and leads to loneliness and violence. Survival itself depends on replacing myths that isolate people with those that bind them together. For example,

> We awake after a sleep of many centuries to find ourselves in a new and irrefutable sense in the myth of humankind. We find ourselves in a new world community; we cannot destroy the parts without destroying the whole. In this bright loveliness we know now that we are truly sisters and brothers, at last in the same family. (May, 1991, p. 302)

May was not the only proponent of existentialism to be interested in matters such as myth and human convention. Philosopher and anthropologist Martin Buber (1878–1965) combined Kierkegaard, Nietzsche, as well as the study of myth and convention in his classic analysis of human language—*I and Thou* (1923/1970). Another anthropologist, and Pulitzer Prize winner, Ernest Becker (1924–1974) combines elements of both Freud and Kierkegaard to explain human nature in books such as *The Denial of Death* and the *Birth of Meaning*. His ideas form the basis of terror management theory, which explains much of social and clinical psychology in terms of our awareness of our own mortality (Solomon, Greenberg, & Pyszczynski, 1991).

Human Science. May was not opposed to studying humans scientifically. He was opposed, however, to merely employing the methods of the physical sciences to study humans. Such methods, he said, overlook attributes that are uniquely human. Instead, May (1967) suggested the creation of a new science specifically designed to study humans:

> The outlines of a science of man we suggest will deal with man as the symbol-maker, the reasoner, the historical mammal, who can participate in his community and who possesses the potentiality of freedom and ethical action. The pursuit of this science will take no less rigorous thought and wholehearted discipline than the pursuit of experimental and natural science at their best, but it will place the scientific enterprise in a broader context. Perhaps it will again be possible to study man scientifically and still see him whole. (p. 199)

Schneider (1998) elaborates the human science envisioned by May and discusses its relevance for contemporary psychology. Also, the emerging field of positive psychology (discussed later in this chapter) is moving in the direction suggested by May.

George Kelly

George Kelly (1905–1967) was born on a farm near Perth, Kansas. An only child, his father was an ordained Presbyterian minister, and his mother was a former schoolteacher. By the time Kelly was born, his father had given up the ministry and turned to farming. In 1909, when Kelly was four years old, his father converted a lumber cart into a covered wagon and with it moved his family to Colorado, where he staked a claim to a plot of land offered free to settlers. Unable to find an adequate amount of water on their claim, the family moved back to Kansas. There, Kelly's education consisted of attending a one-room school and being tutored by his parents. From the pioneering efforts of his family, Kelly developed a pragmatic

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spirit that remained with him throughout his life: the major criterion he used to judge an idea or a device was whether it worked.

When Kelly was 13, he was sent to Wichita, where he attended four different high schools in four years. Upon graduation from high school, he attended Friends University in Wichita for three years and then Park College in Parkville, Missouri, where he earned his bachelor's degree in 1926 with majors in physics and mathematics. Kelly was totally unimpressed by his first psychology class. For several class meetings, he waited in vain for something interesting to be said. Finally, one day the instructor wrote "S→R" on the blackboard, and Kelly (1969) believed that finally he was going to hear something interesting. He recalled his disappointment:

> Although I listened intently for several sessions, after that the most I could make of it was that the "S" was what you had to have in order to account for the "R" and the "R" was put there so the "S" would have something to account for. I never did find out what that arrow stood for—not to this day—and I have pretty well given up trying to figure it out. (p. 47)

Next, Kelly went to the University of Kansas, where he earned his master's degree in 1928 with a major in educational psychology and a minor in labor relations. While at the University of Kansas, Kelly decided that it was time for him to become acquainted with Freud's writings. Freud did not impress him any more than S→R psychology did: "I don't remember which one of Freud's books I was trying to read, but I do remember the mounting feeling of incredulity that anyone could write such nonsense, much less publish it" (1969, p. 47).

The next year was a busy one for Kelly; he taught part-time in a labor college in Minneapolis and gave speech classes for the American Bankers Association and an Americanization class to immigrants wishing to become U.S. citizens. In the winter of 1928, he moved to Sheldon, Iowa, where he taught at a junior college. Among his other duties, Kelly coached dramatics, and this experience may have influenced his later theorizing. It was here that Kelly met his future wife, Gladys Thompson, an English teacher at the same school. After a year and a half, Kelly returned to Minnesota, where he taught for a brief time at the University of Minnesota. He then returned to Wichita to work for a while in aeronautical engineering. In 1929 he received an exchange scholarship, which allowed him to study for a year at the University of Edinburgh in Scotland. It was while earning his advanced degree in education at Edinburgh under the supervision of the illustrious statistician and psychologist Sir Godfrey Thomson that Kelly became interested in psychology. His thesis was on predicting teaching success.

In 1930, on his return from Scotland, Kelly enrolled in the graduate program in psychology at the State University of Iowa, where he obtained his doctorate in 1931. His dissertation was on the common factors in speech and reading disabilities. Kelly began his academic career at Fort Hays Kansas State College during the Great Depression. This

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George Kelly

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was a time when there were many troubled people; Kelly desperately wanted to help them, but his training in experimental psychology did not equip him to do so. Ironically however, his lack of training in clinical psychology, along with his pragmatic attitude, gave Kelly great latitude in considering emotional problems, and his observations eventually resulted in his unique theory of personality.

Soon after arriving at Fort Hays, Kelly developed traveling clinics that serviced the public school system. The clinics brought Kelly into contact with a wide range of emotional problems that both students and teachers experienced. Kelly soon made a remarkable observation. Because he was not trained in any particular therapeutic approach, he began to experiment with a variety of approaches, and he discovered that *anything that caused his clients to view themselves or their problems differently improved the situation*. Whether a proposed explanation was "logical" or "correct" seemed to have little to do with its effectiveness:

> I began fabricating "insights." I deliberately offered "preposterous interpretations" to my clients. Some of them were about as un-Freudian as I could make them—first proposed somewhat cautiously, of course, and then, as I began to see what was happening, more boldly. My only criteria were that the explanation account for the crucial facts as the client saw them, and that it carry implications for approaching the future in a different way. (Kelly, 1969, p. 52)

In this statement lies the cornerstone of Kelly's position: Whether or not a person has a psychological problem is mainly a matter of how that person views things.

At the beginning of World War II, Kelly joined the Navy and was placed in charge of a local civilian pilot-training program. After the war, he taught at the University of Maryland for a year and in 1946 moved to Ohio State University as professor of psychology and director of clinical psychology. It was during his 19 years at Ohio State that Kelly refined his theory of personality and his approach to psychotherapy. In 1955, he published his most important work, *The Psychology of Personal Constructs*, in two volumes.

In 1960 Kelly and his wife received a grant from the human ecology fund, allowing them to travel around the world discussing the relationship between Kelly's theory and international problems. In 1965 Kelly accepted a position at Brandeis University, where for a short time he was a colleague of Maslow. Kelly died in 1967, at the age of 62. His honors included presidencies of both the clinical and counseling divisions of the APA. He also headed the American Board of Examiners in Professional Psychology, an organization whose purpose was to improve the quality of professional psychology.

Constructive Alternativism. Kelly observed that the major goal of scientists is to reduce uncertainty; and because he believed that this is also the goal of all humans, he said all humans are like scientists. But whereas scientists create theories with which they attempt to predict future events, nonscientists create **construct systems** to predict future events. If either a scientific theory or a personal construct system is effective, it adequately predicts the future and thereby reduces uncertainty. And both scientific theories and construct systems are tested empirically. That is, they are checked against reality and are revised until their ability to predict future events or experiences is satisfactory. For Kelly, a construct was a verbal label. For example,

> On meeting a person for the first time, one might construe that person with the construct "friendly." If the person's subsequent behavior is in accordance with the construct of friendly, then the construct will be useful in anticipating that person's behavior. If the new acquaintance acts in an unfriendly manner, he or she will need to be construed either with different constructs or by using the other pole … of the friendly-unfriendly construct. The major point is that constructs are used to anticipate the future, so they must fit reality. Arriving at a construct system that corresponds fairly closely to reality is largely a

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> matter of trial and error. (Hergenhahn & Olson, 2007, p. 409)

For Kelly, whether or not an experience is pleasant is relatively unimportant. Of greater importance is whether or not it validates the predictions generated by one's construct system. Kelly (1970) said, "Confirmation and disconfirmation of one's predictions [have] greater psychological significance than rewards, punishments, or drive reduction" (p. 11).

With his concept of **constructive alternativism**, Kelly aligned himself squarely with the existentialists. Kelly maintained that people are free to choose the constructs they use in interacting with the world. This means that people can view and interpret events in an almost infinite number of ways because construing them is an individual matter. No one needs to be a victim of circumstances nor a victim of the past; all are free to view things as they wish:

> We take the stand that there are always some alternative constructions available to choose among in dealing with the world. No one needs to paint himself into a corner; no one needs to be completely hemmed in by circumstances; no one needs to be the victim of his biography. (Kelly, 1955, Vol. 1, p. 15)

According to Kelly, it is not common experience that makes people similar; rather, it is how they construe reality. If two people employ more or less the same personal constructs in dealing with the world, then they are similar no matter how dissimilar their past experiences had been. Kelly also said that to truly understand another person, we have to know how that person construes things. In other words, we have to know what that person's expectations are, and then we can choose to act in accordance with those expectations. The deepest type of social interaction occurs when this process is mutual.

Kelly and Vaihinger. Although Kelly's thinking was existential in nature, there is no evidence that any existential philosophers or psychologists directly influenced him. However, he was aware of Vaihinger's philosophy of "as if." Although there are important differences between Vaihinger's philosophy and Kelly's theory (see Hermans, Kempen, & Van Loon, 1992), both emphasized **propositional thinking**, or the experimentation with ideas to see where they lead. About Vaihinger, Kelly (1964) said,

> Toward the end of the last century a German philosopher, Hans Vaihinger, began to develop a system of philosophy he called the "philosophy of 'as if.' " In it he offered a system of thought in which God and reality might best be represented as [propositions]. This was not to say that either God or reality was any less certain than anything else in the realm of man's awareness, but only that all matters confronting man might best be regarded in hypothetical ways. In some measure, I suppose, I am suggesting that Vaihinger's position has particular value for psychology. At least, let us pursue the topic—which is probably just the way Vaihinger would have proposed that we go at it. (p. 139)

The following statement nicely summarizes Kelly's belief in the importance of propositional thinking and exemplifies his kinship with existential philosophy: "Whatever nature may be, or however the quest for truth will turn out in the end, the events we face today are subject to as great a variety of constructions as our wits will enable us to contrive" (1970, p. 1).

Fixed-Role Therapy. Kelly's approach to therapy reflected his belief that psychological problems are *perceptual problems* and that the job of the therapist is therefore to help the client *view* things differently. Kelly often began the therapeutic process by having a client write a **self-characterization**, which provided Kelly with information about how the client viewed himself or herself, the world, and other people. Next, Kelly created a role for the client to play for about two weeks. The character in the role was markedly different from the client's self-characterization. The client became an actor, and the therapist became a supporting actor. Kelly called this approach to treating clients **fixed-role**

therapy. He hoped that this procedure would help the client discover other possible ways of viewing his or her life:

> What I am saying is that it is not so much what man is that counts as it is what he ventures out to make himself. To make the leap he must do more than disclose himself; he must risk a certain amount of confusion. Then, as soon as he does catch a glimpse of a different kind of life, he needs to find some way of overcoming the paralyzing moment of threat, for this is the instant when he wonders what he really is—whether he is what he just was or is what he is about to be. (Kelly, 1964, p. 147)

In the role of supporting actor, the therapist helps the client deal with this threatening moment and then provides experiences that validate the client's new construct system. According to Kelly, people with psychological problems have lost their ability to make-believe, an ability that the therapist must help the client regain. Kelly's fixed-role therapy can be seen as an early version of narrative therapy that was discussed earlier.

In the 1960s, there was much talk about people being "themselves"; Kelly's advice was the opposite:

> A good deal is said these days about being oneself. It is supposed to be healthy to be oneself. While it is a little hard for me to understand how one could be anything else, I suppose what is meant is that one should not strive to become anything other than what he is. This strikes me as a very dull way of living; in fact, I would be inclined to argue that all of us would be better off if we set out to be something other than what we are. Well, I'm not so sure we would all be *better* off—perhaps it would be more accurate to say life would be a lot more *interesting*. (Kelly, 1964, p. 147)

Kelly became a major force within clinical psychology in the postwar years, both directly and through the works of his colleagues and students, including Julian Rotter (who coined the term *locus of control* to distinguish between events we take responsibility for versus those we blame on external forces) and the humanistic psychologist Joseph Rychlak, whose texts popularized Kelly as a social psychologist and personality theorist. In England Kelly's ideas remain popular—even after his death—primarily because of the efforts of his disciple Donald Bannister. Exposure to Kelly's theory is a requirement in most clinical programs approved by the British Psychological Association. The popularity of Kelly's theory is again growing in the United States, especially in the area of industrial-organizational psychology (Jankowicz, 1987; Neimeyer & Jackson, 1997). Other areas to which Kelly's theory is being applied include friendship formation, developmental psychology, perception, political science, and environmental psychology (Adams-Webber, 1979; Mancuso & Adams-Webber, 1982); depression and suicide (Neimeyer, 1984; Parker, 1981); obsessive-compulsive disorders (Rigdon & Epting, 1983); drug and alcohol abuse (Dawes, 1985; Rivers & Landfield, 1985); childhood disorders (Agnew, 1985); fear of death and physical illness (Robinson & Wood, 1984; Viney, 1983, 1984); couples in conflict (Neimeyer & Hudson, 1984); and other relationship disorders (Leitner, 1984; Neimeyer & Neimeyer, 1985).

HUMANISTIC PSYCHOLOGY

Abraham Maslow

Some argue that Alfred Adler should be considered the first humanistic psychologist because he defined a healthy lifestyle as one reflecting a considerable amount of social interest and his concept of the creative self stressed that what a person becomes is largely a matter of personal choice. Certainly, Adler's theory had much in common with those theories later called humanistic. Usually, however, **Abraham Maslow (1908–1970)** is recognized as the one most responsible for making **humanistic psychology** a formal branch of psychology.

Maslow was born in Brooklyn, New York. He was the oldest of seven children born to parents who were Jewish immigrants from Russia. Maslow

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recalled his father Samuel as loving whiskey, women, and fighting (Wilson, 1972). Maslow disliked his father but eventually made peace with him. Not so with his mother, however; Maslow hated his mother all his life:

> [Maslow] grew to maturity with an unrelieved hatred for her and never achieved the slightest reconciliation. He even refused to attend her funeral. He characterized Rose Maslow as a cruel, ignorant, and hostile figure, one so unloving as to nearly induce madness in her children. In all of Maslow's references to his mother—some uttered publicly while she was still alive—there is not one that expresses any warmth or affection. (Hoffman, 1988, p. 7)

It is interesting that Maslow saw the motivation for his work in humanistic psychology in his hatred of his mother. Shortly before he died, Maslow entered the following comment in his personal journal:

> I've always wondered where my Utopianism, ethical stress, humanism, stress on kindness, love, friendship, and all the rest came from. I knew certainly of the direct consequences of having no mother-love. But the whole thrust of my life-philosophy and all my research and theorizing also has its roots in a hatred for and revulsion against everything she stood for. (Lowry, 1979, p. 958)

Abraham Maslow

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Not being close to his parents and being the only Jewish boy in his neighborhood, Maslow was intensely lonely and shy and took refuge in books and scholarly pursuits. He was an excellent student at Boys High School in Brooklyn and went on to attend City College of New York. While attending City College, he made an effort to satisfy his father's desire for him to become a lawyer by also attending law school. Unhappy with law school, however, he walked out of class one night, leaving his books behind. Thereafter, he transferred to Cornell University, where he took introductory psychology from Titchener. Titchener's approach to psychology did not impress Maslow, and following only one semester at Cornell he transferred back to City College, partly to be near his first cousin Bertha Goodman, whom he loved very much. He and Bertha were married in 1928 when he was 20 and she was 19. Prior to their marriage, Maslow enrolled at the University of Wisconsin, and Bertha joined him there. By Maslow's own account, his life did not really begin until he and Bertha moved to Wisconsin.

As ironic as it now seems, Maslow was first infatuated with the behaviorism of John Watson, in which he saw a way of solving human problems and changing the world for the better. His infatuation ended when he and Bertha had their first child:

> Our first baby changed me as a psychologist. It made the behaviorism I had been so enthusiastic about look so foolish I could not stomach it anymore. That was the thunderclap that settled things.… I was stunned by the mystery and by the sense of not really being in control. I felt small and weak and feeble before all this. I'd say anyone who had a baby couldn't be a behaviorist. (M. H. Hall, 1968, p. 55)

At the University of Wisconsin, Maslow earned his bachelor's degree in 1930, his master's degree in 1931, and his doctorate in 1934. As a graduate

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student at Wisconsin, Maslow became the first doctoral student of the famous experimental psychologist Harry Harlow. Maslow's dissertation was on the establishment of dominance in a colony of monkeys. He observed that dominance has more to do with a type of "inner confidence" than with physical strength, an observation that may have influenced his later theorizing. During this time, Maslow also observed that sexual behavior within the colony was related to dominance and subservience, and he wondered whether the same was true for human sexual activity, a possibility he would subsequently explore. After receiving his doctorate, Maslow taught at Wisconsin for a while before moving to Columbia University, where he became Edward Thorndike's research assistant. He also began his research on human sexuality by interviewing both male and female college students about their sexual behavior, but soon abandoned males because they tended to lie too much about their sexual activities (Hoffman, 1988). Maslow made important contributions to our knowledge of human sexuality several years before Kinsey's famous research. Furthermore, the interviewing skills he developed during this research served him well when he later studied the characteristics of psychologically healthy individuals.

After a year and a half at Columbia, Maslow moved to Brooklyn College, where he stayed until 1951. Living in New York in the 1930s and 1940s gave Maslow an opportunity to come into contact with many prominent European psychologists who came to the United States to escape the Nazi rise. Among them were Erich Fromm, Max Wertheimer, Karen Horney, and Alfred Adler. Adler began giving seminars in his home on Friday evenings, which Maslow attended frequently. Maslow also befriended the famous anthropologist Ruth Benedict about this same time. Maslow became obsessed with trying to understand Ruth Benedict and Max Wertheimer, whom he considered truly exceptional people, and it was this obsession that evolved into Maslow's version of humanistic psychology.

In 1951 Maslow accepted the position of chairman of the psychology department at Brandeis University in Waltham, Massachusetts, and it was here that Maslow became the leading figure in third-force psychology. In 1968, because of increased disenchantment with academic life and failing health, Maslow accepted a fellowship offered to him by the Saga Administrative Corporation. Hoffman (1988) describes the offer that was made to Maslow:

> Laughlin [the president and chairman of the Saga Corporation] cheerfully informed Maslow, the fellowship was ready. He was prepared to offer Maslow a two-to-four-year commitment with the following conditions: a handsome salary, a new car, and a personally decorated private office with full secretarial services at Saga's attractive campus like headquarters on Stanford University's suburban outskirts. What would Maslow have to do in return? Nothing. (p. 316)

Maslow accepted and, as advertised, was free to think and write as he pleased, and he enjoyed his freedom very much. In June 1970, however, Maslow suffered a heart attack while jogging and died at the age of 62.

Due primarily to Maslow's efforts, the *Journal of Humanistic Psychology* was founded in 1961; also in 1961, the American Association of Humanistic Psychologists was established, with James F. T. Bugental as its first president; and a division of the American Psychological Association (APA), Humanistic Psychology, was created in 1971.

The Basic Tenets of Humanistic Psychology. The beliefs shared by psychologists working within the humanistic paradigm include the following:

- Little of value can be learned about humans by studying nonhuman animals.
- Subjective reality is the primary guide for human behavior.
- Studying individuals is more informative than studying what groups of individuals have in common.
- A major effort should be made to discover those things that expand and enrich human experience.

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- Research should seek information that will help solve human problems.
- The goal of psychology should be to formulate a complete description of what it means to be a human being. Such a description would include the importance of language, the valuing process, the full range of human emotions, and the ways humans seek and attain meaning in their lives.

Charlotte R. Bühler (1893–1974) was a founding member of the Association of Humanistic Psychologists and served as its president in 1965–1966. Her influential position paper on humanistic psychology (1971) elaborated several of the tenets listed above and showed their relevance to such topics as creativity, education, and psychotherapy. The wife of Gestalist Karl Bühler, Charlotte had also worked with Thorndike, and was key figure in child psychology prior to World War II.

Humanistic psychology, which rejects the notion that psychology should be entirely scientific, sees humans as indivisible wholes. Any attempt to reduce them to habits, cognitive structures, or S–R connections results in a distortion of human nature. According to Maslow (1966), psychologists often use scientific method to cut themselves off from the poetic, romantic, and spiritual aspects of human nature:

> Briefly put, it appears to me that science and everything scientific can be and often is used as a tool in the service of a distorted, narrowed, humorless, de-eroticized, de-emotionalized, de-sacralized, and de-sanctified *Weltanschauung* [world-view]. This de-sacralization can be used as a defense against being flooded by emotion, especially the emotions of humility, reverence, mastery, wonder and awe. (p. 139)

Humanistic psychologists flatly reject the goal of predicting and controlling human behavior, which so many scientifically inclined psychologists accept:

> If humanistic science may be said to have any goals beyond sheer fascination with the human mystery and enjoyment of it, these would be to release the person from external controls and to make him less predictable to the observer (to make him freer, more creative, more inner determined) even though perhaps more predictable to himself. (Maslow, 1966, p. 40)

Humans, then, are much more than physical objects, and therefore the methods employed by the physical sciences have little relevance to the study of humans. Similarly, psychoanalysis, by concentrating on the study of psychologically disturbed individuals, creates a "crippled" psychology: "It becomes more and more clear that the study of crippled, stunted, immature, and unhealthy specimens can yield only a crippled psychology and a crippled philosophy" (Maslow, 1954/1970, p. 180). For Maslow, there are exceptional people whose lives cannot be understood simply as the absence of mental disorders, so these people must be studied directly:

> Health is not simply the absence of disease or even the opposite of it. Any theory of motivation that is worthy of attention must deal with the highest capacities of the healthy and strong person as well as with the defensive maneuvers of crippled spirits. (Maslow, 1954/1987, p. 14)

Importantly, Maslow's point was not that psychology should stop attempting to be scientific or stop studying and attempting to help those with psychological problems, but that such endeavors tell only part of the story. Beyond this, psychology needs to attempt to understand humans who are in the process of reaching their full potential. We need to know how such people think and what motivates them. Thus, Maslow invested most of his energies in trying to understand exceptional humans.

The Hierarchy of Needs. According to Maslow, human needs are arranged in a hierarchy. The lower the needs in the hierarchy, the more basic they are and the more similar they are to the needs of other animals. The higher the needs in the hierarchy, the more distinctly human they are.

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The needs are arranged so that as one satisfies a lower need, one can deal with the next higher need. When one's physiological needs (such as hunger, thirst, and sex) are satisfied, one can deal with the safety needs (protection from the elements, avoiding pain, and unexpected dangers); when the safety needs are reasonably satisfied, one is free to deal with the belonging and love needs (the need to love and be loved, to share one's life with a relevant other); when the belonging and love needs are adequately satisfied, one is released to ponder the esteem needs (to make recognizable contributions and achievements); if the esteem needs are met satisfactorily, one is in a position to become self-actualized. Maslow's proposed **hierarchy of needs** can be diagrammed as follows:

Self-Actualization
↑
Esteem Needs
↑
Belonging and Love Needs
↑
Safety Needs
↑
Physiological Needs

Self-Actualization. By **self-actualization**, Maslow meant reaching one's full, human potential:

> So far as motivational status is concerned, healthy people have sufficiently gratified their basic needs for safety, belongingness, love, respect, and self-esteem so that they are motivated primarily by trends to self-actualization defined as ongoing actualization of potentials, capacities and talents, as fulfillment of mission (or call, fate, destiny, or vocation), as a fuller knowledge of, and acceptance of, the person's own intrinsic nature, as an unceasing trend toward unity, integration or synergy within the person. (Maslow, 1968, p. 25)
>
> Musicians must make music, artists must paint, poets must write if they are to be ultimately at peace with themselves. What humans can be, they must be. They must be true to their own nature. This need we may call self-actualization. (Maslow, 1954/1987, p. 22)

Aspects of the concept of self-actualization go back at least as far as Aristotle, but what Aristotle meant by self-actualization was the innate tendency to manifest the characteristics or the essence of one's species. For example, an acorn has an innate tendency to become an oak tree and to exhibit the characteristics of oak treeness. Jung reintroduced the concept of self-actualization into modern psychology, and what he meant by the term and what Maslow later meant by it was distinctly different from the Aristotelian meaning. By *self-actualization*, Jung, Maslow, and Rogers (whom we consider next) meant the realization of an *individual's* potential. Because it is impossible for any person to completely reach his or her full potential, Maslow referred to those who have satisfied hierarchical needs as self-actualizing. (A list of characteristics of self-actualizing people is given shortly.)

As one climbs the hierarchy, the needs become more fragile. That is, the physiological and safety needs have a long evolutionary history and are therefore very powerful; the higher needs for love, esteem, and self-actualization are "newer" and distinctly human and therefore do not have as firm a biological foundation. This means that their satisfaction is easily interfered with. The higher up the hierarchy one goes, the truer this is; and therefore the satisfaction of the need for self-actualization—although the need is innate—is easily disturbed. Of self-actualization, Maslow said, "This inner nature is not strong and overpowering and unmistakable like the instincts of animals. It is weak and delicate and subtle and easily overcome by habit, cultural pressure, and wrong attitudes toward it" (1968, p. 4).

Thus, although all humans have an innate drive to be self-actualized (to reach their full potential as humans), self-actualized people are rare. Another major reason that self-actualization occurs so infrequently is that it requires a great deal of honest knowledge of oneself, and most humans are fearful of such knowledge:

> More than any other kind of knowledge we fear knowledge of ourselves, knowledge that might transform our self-esteem and

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> our self-image.… While human beings love knowledge and seek it—they are curious—they also fear it. The closer to the personal it is, the more they fear it. (p. 16)

Related to the fear of self-knowledge is the **Jonah complex**, which Maslow (1971) defined as "fear of one's own greatness, … evasion of one's destiny, … running away from one's best talents" (p. 34). According to Maslow, humans often fear success as much as they do failure and this fear, like the fear of self-knowledge, militates against self-actualization.

The Characteristics of Self-Actualizing People. As we have seen, Maslow believed that for too long psychology had emphasized the study of lower animals and psychologically disturbed individuals. To begin to remedy the situation, he studied a number of people he thought were self-actualizing. Among them were Albert Einstein, Albert Schweitzer, Sigmund Freud, Jane Addams, William James, and Abraham Lincoln. Maslow concluded that self-actualizing people have the following characteristics:

- They perceive reality accurately and fully.
- They demonstrate a great acceptance of themselves and of others.
- They exhibit spontaneity and naturalness.
- They have a need for privacy.
- They tend to be independent of their environment and culture.
- They demonstrate a continuous freshness of appreciation.
- They tend to have periodic mystic or peak experiences. Maslow (1954/1987) described peak experiences as

  > feelings of limitless horizons opening up to the vision, the feeling of being simultaneously more powerful and also more helpless than one ever was before, the feeling of great ecstasy and wonder and awe, the loss of placing in time and space with, finally, the conviction that something extremely important and valuable had happened, so that the subject is to some extent transformed and strengthened even in his daily life by such experiences. (p. 137)

- They are concerned with all humans instead of with only their friends, relatives, and acquaintances.
- They tend to have only a few friends.
- They have a strong ethical sense but do not necessarily accept conventional ethics.
- They have a well-developed but not hostile sense of humor.
- They are creative.

Although Maslow (1954/1987) concluded that his group of self-actualizing people was made up of outstanding humans, he also indicated that they were not without faults:

> Our subjects show many of the lesser human failings. They too are equipped with silly, wasteful or thoughtless habits. They can be boring, stubborn, irritating. They are by no means free from a rather superficial vanity, pride, partiality to their own productions, family, friends, and children. Temper outbursts are not rare.
>
> Our subjects are occasionally capable of an extraordinary and unexpected ruthlessness. It must be remembered that they are very strong people. This makes it possible for them to display a surgical coldness when this is called for, beyond the power of the average man. The man who found that a long-trusted acquaintance was dishonest cut himself off from this friendship sharply and abruptly and without any observable pangs whatsoever. Another woman who was married to someone she did not love, when she decided on divorce, did it with a decisiveness that looked almost like ruthlessness. Some of them recover so quickly from the death of people close to them as to seem heartless. (p. 146)

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Deficiency and Being Motivation. If a person is functioning at any level other than self-actualization, he or she is said to be deficiency-motivated. That is, the person is seeking specific things to satisfy specific needs, and his or her perceptions are need-directed. Jourard describes **need-directed perception** (also called deficiency or D-perception) as follows: "Need-directed perception is a highly focused searchlight darting here and there, seeking the objects which will satisfy needs, ignoring everything irrelevant to the need" (1974, p. 68). **Deficiency motivation** (D-motivation) leads to need-directed perception.

Unlike most psychologists, Maslow was mainly interested in what happens to people *after* their basic needs are satisfied. His answer was that people who satisfy their basic needs and become self-actualizing enter into a different mode of existence. Instead of being deficiency-motivated, they are being-motivated (B-motivated). **Being motivation** involves embracing the higher values of life such as beauty, truth, and justice. Being-motivated people are also capable of B-love, which unlike D-love is nonpossessive and insatiable. Unlike D-perception, **being perception** (B-perception) does not involve seeking specific things in the environment. Therefore, the person interacting with the world through B-perception is open to a wider range of experience than the person who interacts through D-perception.

Transpersonal Psychology. Toward the end of his life, Maslow began to ponder a new kind of psychology that went beyond personal experience. This **transpersonal psychology** would constitute a fourth force and would focus on the mystical, ecstatic, or spiritual aspects of human nature. In the preface of his book *Toward a Psychology of Being* (1968), Maslow described his vision of fourth-force psychology:

> I … consider Humanistic, Third Force Psychology to be transitional, a preparation for a still "higher" Fourth Psychology, transpersonal, transhuman, centered in the cosmos rather than in human needs and interest, going beyond humanness, identity, self-actualization, and the like.… These new developments may very well offer a tangible, usable, effective satisfaction of the "frustrated idealism" of many quietly desperate people, especially young people. These psychologies give promise of developing into the life-philosophy, the religion-surrogate, the value-system, the life-program that these people have been missing. Without the transcendent and the transpersonal, we get sick, violent, and nihilistic, or else hopeless and apathetic. We need something "bigger than we are" to be awed by and to commit ourselves to in a new, naturalistic, empirical, non-churchly sense. (pp. iii–iv)

Maslow lived to see Anthony J. Sutich (1907–1976), who was also a founding editor of the *Journal of Humanistic Psychology*, found the *Journal of Transpersonal Psychology* in 1969. Maslow's "The Farther Reaches of Human Nature" appeared as the lead article in the new journal. (This article should not be confused with the book of readings published posthumously [1971] with the same title.) Transpersonal psychology has much in common with non-Western psychologies, philosophies, and religions. For example, all recognize meditation as a way of getting in touch with the higher states of consciousness. Many interested in the occult and in parapsychology are attracted to humanistic psychology and especially to transpersonal psychology. Perhaps because these topics are generally viewed as outside the realm of science, the APA has thus far denied petitions to create a division of transpersonal psychology.

Maslow's many honors include election to the presidency of the APA in 1968. At the time of his death in 1970, Maslow's ideas were influential not only within psychology but also in fields such as medicine, marketing, theology, education, and nursing. Although Maslow's influence has diminished, it is not uncommon for his theory of motivation to be taught in psychology, education, and business courses. Coon (2006) speculates as to the reasons for Maslow's lasting appeal:

> Perhaps it is that his theory of motivation embodies deeply felt democratic ideals

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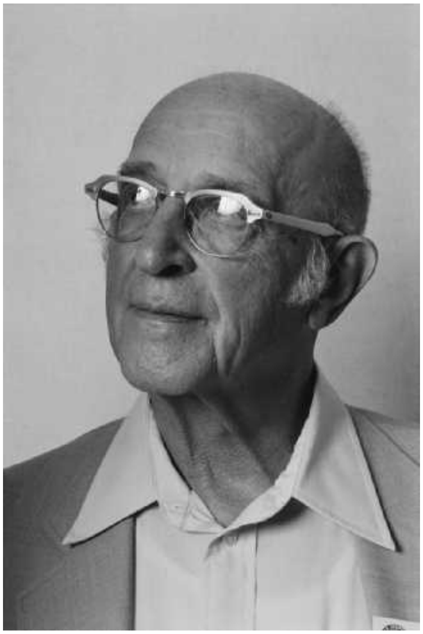
> expressed in psychological terms. It is hopeful and optimistic, even utopian in its dream of an eventual Eupsychia [good mind country]. Given the right set of psychological and social conditions, every person among us has the potential to become happy, fulfilled, creative, emotionally whole—in Maslow's terms, self- actualized. It is the American ethos of self-improvement taken to its ultimate psychological conclusion, and it unabashedly embraces our right to life, liberty, and the pursuit of happiness. (pp. 270–271)

Carl Rogers

Carl Rogers (1902–1987) was born in the Chicago suburb of Oak Park, Illinois, and was the fourth of six children. He was closer to his mother than to his father, who was a successful civil engineer and was often away from home. In the affluent suburb of Oak Park, Rogers attended school with Ernest Hemingway and the children of the famous architect Frank Lloyd Wright. Rogers described his family as closely knit and highly religious. Friendships outside the family were discouraged:

> I think the attitudes toward persons outside our large family can be summed up schematically in this way: Other persons behave in dubious ways which we do not approve in our family. Many of them play cards, go to movies, smoke, drink, and engage in other activities—some unmentionable. So the best thing to do is to be tolerant of them, since they may not know better, and to keep away from any close communication with them and live your life within the family. (Rogers, 1973, p. 3)



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Carl Rogers

Not surprisingly, Rogers was a loner in school and, like Maslow, took refuge in books, reading everything that he could get his hands on, including encyclopedias and dictionaries. When Rogers was 12 years old, he and his family moved to a farm 25 miles west of Chicago. The purpose of the move was to provide a more wholesome and religious atmosphere for the family. Because his father insisted that the farm be run scientifically, Rogers developed an intense interest in science, reading extensively about agricultural experiments. Rogers maintained this interest in science throughout his career, although he worked in one of psychology's more subjective areas. When Rogers graduated from high school, he intended to become a farmer; and when he entered the University of Wisconsin in 1919, he chose to study agriculture. In his early years in college, Rogers was very active in church activities, and in 1922 he was selected to attend the World Student Christian Federation Conference in Peking (Beijing), China. During this six-month trip, Rogers, for the first time, experienced people of different cultures with different religions. Rogers wrote to his parents declaring his independence from their conservative religion, and almost immediately he developed an ulcer that caused him to be hospitalized for several weeks.

Upon returning to the University of Wisconsin, Rogers changed his major from agriculture to history. He received his bachelor's degree in 1924.

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Shortly after graduation, he married his childhood sweetheart, Helen Elliott, with whom he eventually had two children. Soon after their marriage, Carl and Helen moved to New York, where he enrolled in the liberal Union Theological Seminary while also taking courses in psychology and education at neighboring Columbia University. After two years at the seminary, Rogers's doubts about whether the religious approach was the most effective way of helping people caused him to transfer to Columbia University on a full-time basis; there he earned his doctorate in 1931. His dissertation concerned the measurement of personality adjustment in children.

After obtaining his doctorate, Rogers went to work for the Child Study Department of the Society for the Prevention of Cruelty to Children in Rochester, New York, where he had served as a fellow while working toward his doctorate. Rogers had several experiences there that caused him to develop his own brand of psychotherapy. For example, the society was dominated by therapists trained in the psychoanalytic tradition, people who saw their job as gaining an "insight" into the cause of a problem and then sharing that insight with the client. At first, Rogers followed this procedure. In one case, he concluded that a mother's rejection of her son was the cause of the son's delinquent behavior, but his attempts to share this insight with the mother failed completely. Rogers (1961) described what happened next:

> Finally I gave up. I told her that it seemed we had both tried, but we had failed.... She agreed. So we concluded the interview, shook hands, and she walked to the door of the office. Then she turned and asked, "Do you take adults for counseling here?" When I replied in the affirmative, she said, "Well then, I would like some help." She came to the chair she had left, and began to pour out her despair about her marriage, her troubled relationship with her husband, her sense of failure and confusion, all very different from the sterile "Case History" she had given before. Real therapy began then.
>
> This incident was one of a number which helped me to experience that fact—only fully realized later—that it is the client who knows what hurts, what directions to go, what problems are crucial, what experiences have been deeply buried. It began to occur to me that unless I had a need to demonstrate my own cleverness and learning, I would do better to rely upon the client for the direction of movement in the process. (pp. 11–12)

It was while Rogers was employed by the Child Study Department that he wrote his first book, *The Clinical Treatment of the Problem Child* (1939), and its publication led to an offer of an academic position at Ohio State University. Rogers was reluctant to leave the clinical setting, but when Ohio State agreed to start him at the rank of full professor, he decided, at the age of 38, to begin a new career in the academic world. At Ohio, Rogers communicated his own ideas concerning the therapeutic process in his now famous *Counseling and Psychotherapy: Newer Concepts in Practice* (1942). It is widely believed that this book described the first major alternative to psychoanalysis. Rogers's approach to psychotherapy was considered revolutionary because it eliminated the needs for diagnosis, a search for the causes of disturbances, and any type of labeling of disorders. He also refused to call disturbed individuals "patients," as had been the case with the psychoanalysts; for Rogers, people seeking help were "clients." Gendlin (1988) said that Rogers's proposed alternative to psychoanalysis was nothing less than a "war against monolithic authority" (p. 127).

As part of the war effort, in 1944 Rogers took a leave from Ohio State to become director of counseling services for the United Services Organization in New York. After one year, Rogers moved to the University of Chicago as professor of psychology and director of counseling. It was during his 12-year stay at Chicago that Rogers wrote what many consider to be his most important work, *Client-Centered Therapy: Its Current Practice, Implications, and Theory* (1951). This book marked a change in Rogers's approach to psychology. Originally, his approach was called nondirective, believing that in a positive therapeutic atmosphere clients would solve their problems automatically. Therapy became client-centered when Rogers realized that the therapist had to make an active attempt to understand and accept a client's subjective reality before progress could be made. It was also at Chicago that Rogers and his colleagues engaged in the first attempt to objectively measure the effectiveness of psychotherapy.

To measure therapy's effectiveness, Rogers used a method called the Q-sort technique created by the British-trained researcher William Stephenson (1953). Rogers's version of the technique involved having clients describe themselves as they were at the moment (real self) and then as they would like to become (ideal self). The two selves were measured in such a way as to allow the correlation between them to be determined. Typically, when therapy begins, the correlation between the two selves is very low, but if therapy is effective it becomes higher. That is, the real self becomes more similar to the ideal self. Using this technique, a therapist can determine the effectiveness of his or her procedures at any point during, or after, therapy (see, for example, Rogers, 1954; Rogers & Dymond, 1955).

In 1957 Rogers returned to the University of Wisconsin, where he held the dual position of professor of psychology and professor of psychiatry. In the early 1960s Rogers was part of an important symposium at Rice University titled "Behaviorism and phenomenology: Contrasting bases for modern psychology." Other contributors included B. F. Skinner, and Wann's (1964) book by the same name provides fascinating coverage. In 1963 Rogers joined the Western Behavioral Sciences Institute (WBSI) in La Jolla, California. At WBSI Rogers became increasingly interested in encounter groups and sensitivity training and less interested in individual therapy. Toward the end of his life, he also became interested in promoting world peace. In 1968 Rogers and 75 of his colleagues resigned from WBSI and formed the Center for the Studies of the Person, also in La Jolla. There, Rogers continued to work with encounter groups, but he expanded his interests in education and international politics. In 1985 he organized the Vienna Peace Project, which brought leaders from 13 countries together, and in 1986 he conducted peace workshops in Moscow. Rogers continued to work on these and other projects until his death on February 4, 1987, from cardiac arrest following surgery for a broken hip.

Rogers received many honors. He served as president of the APA in 1947, and in 1956 he was a corecipient, along with Kenneth Spence and Wolfgang Köhler, of the first Distinguished Scientific Contribution Award from the APA. The latter award moved Rogers to tears because he believed that his fellow psychologists had viewed his work as unscientific: "My voice choked and the tears flowed when I was called forth … to receive [the award]" (Rogers, 1974, p. 117). In 1972 Rogers received the Distinguished Professional Contribution Award from the APA, making him the first person in the history of the APA to receive both the Distinguished Scientific and Professional Contribution Awards.

Rogers's Theory of Personality. At the urging of others, Rogers developed a theory of personality to account for the phenomena he had observed during the therapeutic process. The rudiments of his theory were first presented in his APA presidential address (Rogers, 1947) and then expanded in his *Client-Centered Therapy* (1951). The most complete statement of his theory was in a chapter titled "A Theory of Therapy, Personality, and Interpersonal Relationships, as Developed in the Client-Centered Framework" (Rogers, 1959).

Like Maslow, Rogers postulated an innate human drive toward self-actualization, and believed that if people use this *actualizing tendency* as a frame of reference in living their lives, there is a strong likelihood that they will live fulfilling lives and ultimately reach their potential. Such people are said to be living according to the **organismic valuing process**. Using this process, a person approaches and maintains experiences that are in accord with the actualizing tendency but terminates and avoids those that are not. Such a person is motivated by his or her own true feelings and is living what the existentialists call an authentic life—that is, a life motivated by a person's true inner feelings rather than mores, beliefs, traditions, values, or conventions imposed by others. Here we see Rogers restating the belief of the ancient Cynics and of Rousseau in the primacy of personal feelings as guides for action. In the following quotation (Rogers, 1961), we see a strong similarity among ancient Cynicism, Rousseau's romantic philosophy, and Rogers's humanistic psychology:

> One of the basic things which I was a long time in realizing, and which I am still learning, is that when an activity *feels* as though it is valuable or worth doing, it *is* worth doing. Put another way, I have learned that my total organismic sensing of a situation is more trustworthy than my intellect.
>
> All of my professional life I have been going in directions which others thought were foolish, and about which I have had many doubts myself. But I have never regretted moving in directions which "felt right," even though I have often felt lonely or foolish at the time.… *Experience is for me, the highest authority*.… Neither the Bible nor the prophets—neither Freud nor research—neither the revelations of God nor man—can take precedence over my own experience. (pp. 22–24)

Unfortunately, according to Rogers, most people do not live according to their innermost feelings (the organismic valuing process). A problem arises because of our childhood **need for positive regard**. Positive regard involves receiving such things as love, warmth, sympathy, and acceptance from the relevant people in a child's life. If positive regard is given freely to a child, no problem will arise, but usually it is not freely given. Instead parents (or other relevant people) give children positive regard only if they act or think in certain ways. This sets up **conditions of worth**. The children soon learn that in order to receive love, they must act and think in accordance with the values of the relevant people in their lives. Gradually, as the children internalize those values, the values replace the organismic valuing process as a guide for living life. As long as people live their lives according to someone else's values instead of their own true feelings, experience will be edited, and certain experiences that would have been in accord with the organismic valuing process will be denied:

> In order to hold the love of a parent, the child introjects as his own values and perceptions which he does not actually experience. He then denies to awareness the organismic experiencings that contradict these introjections. Thus, his self-concept contains false elements that are not based on what he is, in his experiencing. (Rogers, 1966, p. 192)

According to Rogers, there is only one way to avoid imposing conditions of worth on people, and that is to give them unconditional positive regard. With **unconditional positive regard**, people are loved and respected for what they truly are; therefore, there is no need for certain experiences to be denied or distorted. Only someone who experiences unconditional positive regard can become a fully functioning person:

> If an individual should *experience* only *unconditional positive regard*, then no *conditions of worth* would develop, self-regard would be unconditional, the needs for *positive regard* and *self-regard* would never be at variance with *organismic evaluation*, and the individual would continue to be *psychologically adjusted*, and would be fully functioning. (Rogers, 1959, p. 224)

When conditions of worth replace the organismic valuing process as a guide for living, the person becomes incongruent. What Rogers called an **incongruent person** is essentially the same as what the existentialists call an inauthentic person. In both cases, the person is no longer true to his or her own feelings. Rogers viewed incongruency as the cause of mental disorders, and he believed

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therefore that the goal of psychotherapy is to help people overcome conditions of worth and again live in accordance with their organismic valuing processes. Rogers (1959) described this goal as follows:

> This, as we see it, is the basic estrangement in man. He has not been true to himself, to his own natural organismic valuing of experience, but for the sake of preserving the positive regard of others has now come to falsify some of the values he experiences and to perceive them only in terms based upon their value to others. Yet this has not been a conscious choice, but a natural—and tragic—development in infancy. The path of development toward psychological maturity, the path of therapy, is the undoing of this estrangement in man's functioning, the dissolving of conditions of worth, the achievement of a self which is congruent with experience, and the restoration of a unified organismic valuing process as the regulator of behavior. (pp. 226–227)

When people are living in accordance with their organismic valuing process, they are fully functioning. The fully functioning person embraces life in much the same way as Maslow's self-actualizing person does.

Rogers fully appreciated the fact that human growth can be facilitated by relationships other than that between therapist and client. Rogers (1980) described the conditions that must characterize *any* relationship if that relationship is going to facilitate personal growth:

> There are three conditions that must be present in order for a climate to be growth promoting. These conditions apply whether we are speaking of the relationship between therapist and client, parent and child, leader and group, teacher and student, or administrator and staff. The conditions apply, in fact, in any situation in which the development of the person is a goal.… The first element could be called *genuineness*, realness, or congruence.… The second attitude of importance in creating a climate for change is acceptance, or caring, or prizing—what I have called "*unconditional positive regard*." … The third facilitative aspect of the relationship is *empathic understanding*.… This kind of sensitive, active listening is exceedingly rare in our lives. We think we listen, but very rarely do we listen with real understanding, true empathy. Yet listening, of this very special kind, is one of the most potent forces for change that I know. (pp. 115–116)

Rogers's person-centered psychology has been applied to such diverse areas as religion, medicine, law enforcement, ethnic and cultural relations, politics, and international conflict, as well as organizational development (Levant & Schlien, 1984); education (Rogers, 1969, 1983); marriage (Rogers, 1972); personal power (Rogers, 1977); and the future (Rogers, 1980). And, we will have more to say about Rogers's contributions to professional psychology in Chapter 20.

Comparison of Existential and Humanistic Psychology

Existential and humanistic psychology have enough in common to cause them often to be lumped together as "existential-humanistic psychology." The following is a list of tenets shared by existential and humanistic psychology:

- Humans have a free will and are therefore responsible for their actions.
- The most appropriate method by which to study humans is phenomenology, the study of intact subjective experience.
- To be understood, the human must be studied as a whole. Elementism of any type gives a distorted view of human nature.
- Humans are unique, and therefore anything learned about other animals is of limited use for the understanding of humans.

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- Each human is unique, therefore, anything learned about one human is of limited use for the understanding of others.
- Living an authentic life is better than living an inauthentic one.
- Because they possess unique attributes such as free will, humans cannot be effectively studied using just traditional scientific methodology.

A major difference between existential and humanistic psychology lies in their assumptions about human nature. The humanists assume that people are basically good, and therefore, if placed in a healthy environment, they will naturally live a life in harmony with others. For humanists, the major motivation in life is the actualizing tendency, which is innate and which continually drives a person toward those activities and events conducive to self-actualization. The existentialists, on the other hand, view human nature as essentially neutral. For them, the only thing we are born with is the freedom to choose the nature of our existence.

This is what Jean-Paul Sartre meant by his famous statement "Existence precedes essence." For Sartre and most existential philosophers, there is no human essence at birth. We are free to choose our own essence as a unique human being. We become our choices: "Man is nothing else but what he makes of himself. Such is the first principle of existentialism" (Sartre, 1957, p. 15). We can exercise our freedom to create any type of life we wish, either good or bad. The major motive in life, according to the existentialist, is to *create* meaning by effectively making choices. Many existential thinkers—such as Albert Camus—reached the conclusion that without meaning, life is not worth living, but that with meaning, humans can tolerate almost any conditions. Viktor Frankl quoted Nietzsche as saying, "He who has a *why* to live can bear with almost any *how*" (1946/1984, p. 12). Frankl maintained that there is only one motivational force for humans, and that is what he called the "will to meaning" (1946/1984, p. 121).

Generally, the view of human nature the humanists hold causes them to be optimistic about people and their future. If societies could be made compatible with our nature, they say, humans could live together in peace and harmony. The existentialists are more pessimistic. For them, humans have no built-in guidance system but only the freedom to choose. Because we are free, we cannot blame God, our parents, genetics, or environmental circumstances for our misfortune—only ourselves. This responsibility often makes freedom more of a curse than a blessing, and people often choose not to exercise their freedom by conforming to values that others have formulated. In his famous book *Escape from Freedom* (1941), Erich Fromm (1900–1980) echoed Kierkegaard in his observation that often the first thing people do when they recognize their freedom is attempt to escape from it by affiliating themselves with someone or something that will reduce or eliminate their choices.

Another important difference between humanistic psychologists and existentialists (like Heidegger, and much later Becker), is that for the existentialist, the realization that one's death is inevitable is extremely important. Before a rich, full life is possible, one must come to grips with the fact that one's life is finite and "live unto death." The humanistic psychologist does not dwell as much on the meaning of death in human existence. For additional discussion of the differences between existential philosophy and humanistic psychology, see deCarvalho (1990).

In Chapter 20 we will note the similarities between third-force psychology and contemporary postmodernism.

Evaluation: Criticisms and Conclusions

It should come as no surprise that humanistic psychology itself has been criticized. Each of the following has been offered as one of its weaknesses:

- The description of persons that humanistic psychologists offer is like the more favorable ones found through the centuries in poetry, literature, or religion. It represents a type of wishful thinking that is not supported by the

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facts that more objective psychology has accumulated. We should not ignore facts just because they are not to our liking.

- Humanistic psychology criticizes behaviorism, psychoanalysis, and scientific psychology in general, but all three have made significant contributions to the betterment of the human condition. In other words, all three have done the very thing that humanistic psychology sets as one of its major goals.
- If humanistic psychology questions traditional scientific methodology as a means of evaluating propositions about humans, what is to be used in its place? If phenomenology is to be used, this enterprise should not be referred to as psychology. The humanistic approach to studying humans is often characterized as a throwback to psychology's past.
- By minimizing animal research, humanistic psychologists are turning their backs on an extremely valuable source of knowledge about humans. Not to use the insights of evolutionary theory in studying human behavior is, at best, regressive.
- Many of the terms and concepts that humanistic psychologists use are so nebulous that they defy clear definition and verification. There is even confusion over the definition of humanistic psychology. After searching for a definition of humanistic psychology in the *Journal of Humanistic Psychology*, in various books on humanistic psychology, and in the programs of the Division of Humanistic Psychology of the APA, Michael Wertheimer (1978) reached the following conclusion:

> It is hard to quarrel with such goals as authenticity, actualizing the potential inherent in every human being, creating truly meaningful human relationships, being fully in touch with our innermost feelings, and expanding our awareness. But what, really, is humanistic psychology? To paraphrase an old Jewish joke, if you ask two humanists what humanistic psychology is, you are likely to get at least three mutually incompatible definitions.… It is highly unlikely that an explicit definition of [humanistic psychology] could be written that would satisfy even a small fraction of the people who call themselves "humanistic psychologists." (pp. 739, 743)

As William James said, if existing methods are ineffective for studying certain aspects of human nature, it is not those aspects of human nature that are to be discarded but the methods. To be fair, humanistic psychologists do not want to discard scientific inquiry; they want to expand our conception of science so that such inquiry can be used to study the higher human attributes.

Indeed, the expansion of psychology's domain is arguably humanistic psychology's major contribution to the discipline. In psychology, there is now an increased tendency to study the whole person. We are concerned with not only how people learn, think, and mature biologically and intellectually but also how people formulate plans to attain future goals and why people laugh, cry, and create meaning in their lives. In the opinion of many, the humanistic paradigm has breathed new life into psychology. Recently, a field called **positive psychology** has developed that, like traditional humanistic psychology, explores positive human attributes. Seligman and Csikszentmihalyi (2000) describe what positive psychology has in common with traditional humanistic psychology and what makes it different:

> [The purpose of positive psychology] is to remind our field that psychology is not just the study of pathology, weakness, and damage; it is also the study of strength and virtue. Treatment is not just fixing what is broken; it is nurturing what is best. Psychology is not just a branch of medicine concerned with illness or health; it is much larger. It is about work, education, insight, love, growth, and play. And in this quest for what is best, positive psychology does not rely on wishful thinking, faith, self-deception, fads, or hand waving; it tries to

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> adapt what is best in the scientific method to the unique problems that human behavior presents to those who wish to understand it in all its complexity. (p. 7)

Both positive psychologists and humanistic psychologists agree that mental health is more than the absence of mental illness. Currently, the term **flourishing** is used to describe people who are not only free from mental illness but, more importantly, are filled with vitality and are functioning optimally in their personal and social lives. In fact, the characteristics of flourishing individuals are essentially the same as those thought by Maslow to characterize self-actualizing individuals or those thought by Rogers to characterize fully functioning individuals.

For additional information on positive psychology, see the work of the 1998 APA President, Martin Seligman (for example, Seligman, Steen, Park, & Peterson, 2005) or Keyes (2007).

SUMMARY

The 1960s were troubled times in the United States, and a group of psychologists emerged who believed that behaviorism and psychoanalysis, the two major forces in psychology at the time, were neglecting important aspects of human existence. What was needed was a third force that emphasized the positive, creative, and emotional side of humans using the methods of phenomenology. Brentano and Husserl developed phenomenology, which is the study of intact, conscious experiences as they occur and without any preconceived notions about the nature of those experiences. According to Brentano, all conscious acts intend (refer to) something outside themselves. An example is the statement "I see that girl." Husserl thought that a careful, objective study of mental phenomena could provide a bridge between philosophy and science.

Both existentialism and phenomenology flourished in Europe around the time of World War II. Key figures in France included Maurice Merleau-Ponty, Jean-Paul Sartre, and Albert Camus. Husserl's student Heidegger expanded phenomenology into existential inquiry. Heidegger studied *Dasein*, or being-in-the-world. Heidegger believed that although humans have a free will, they are thrown by events beyond their control into their life circumstances. Thrownness determines such things as whether a person is male or female, rich or poor, attractive or unattractive, and so on. It is up to each person to make the most of his or her life no matter what the circumstances. Positive growth occurs when a person explores possibilities for living through his or her choices. Choosing, however, requires entering the unknown, and this causes anxiety. For Heidegger, only by exercising one's freedom can one live an authentic life—a life that the person chooses and therefore a life for which the person is completely responsible. If a person lives his or her life in accordance with other people's values, he or she is living an inauthentic life. For Heidegger, the first step toward living an authentic life is to come to grips with the inevitability of death (nonbeing). Once a person comprehends and deals with finitude, he or she can proceed to live a rich, full, authentic life.

Binswanger applied Heidegger's philosophical ideas to psychiatry and psychology. Binswanger called his approach to psychotherapy Daseinanalysis, or the study of a person's approach to being-in-the-world. Like Heidegger, Binswanger believed that the circumstances into which one was thrown place limits on personal freedom. Thrownness creates what Binswanger called the ground of existence from which one has to begin the process of becoming by exercising one's freedom. According to Binswanger, each person attempts to rise above his or her ground of existence and to attain being-beyond-the-world—that is, to rise above current circumstances by transforming them through free choice. Other existential analysts at the time included Jaspers, Frankl, and Boss.

May was primarily responsible for popularizing existential psychology in the United States. Like the

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other existential psychologists, May believed that normal, healthy living involves the experience of anxiety because living an authentic life necessitates venturing into the unknown. If a person cannot cope with normal anxiety, he or she will develop neurotic anxiety and will be driven from an authentic life to a life of conformity or to a life that is overly restrictive. May believed that healthy people embrace myths that provide a sense of identity and community, support moral values, and provide a way of dealing with the mysteries of life. People without such myths feel isolated and fearful and often seek professional help. May believed the most unique aspects of humans elude traditional scientific methodology and, therefore, if humans are to be studied scientifically, a new human science will need to be created.

Kelly, who was not formally trained as a clinical psychologist, tried a number of approaches to helping emotionally disturbed individuals. He found that anything that caused his clients to view themselves and their problems differently resulted in improvement. Because of this observation, Kelly concluded that mental problems are really perceptual problems, and he maintained that humans are free to construe themselves and the world in any way they choose.

According to Maslow, usually considered the founder of third-force psychology, human needs are arranged in a hierarchy. If one satisfactorily meets the physiological, safety, belonging and love, and esteem needs, then one is in position to become self-actualized. Leading a life characterized by fullness, spontaneity, and creativity, the self-actualizing person is being-motivated rather than deficiency-motivated. That is, because this person has met the basic needs, he or she does not need to seek specific things in the environment. Rather, he or she can embrace the world fully and openly and ponder the higher values of life.

Like Kelly, Rogers concluded that the only way to understand a person is to determine how that person views things—that is, to determine that person's subjective reality. This view resulted in Rogers's famous client-centered therapy, which became a major therapeutic alternative to psychoanalysis. Like Maslow, Rogers postulated an innate actualizing tendency. For this actualizing tendency to be realized, one has to use the organismic valuing process as a frame of reference in living one's life; that is, one has to use one's own inner feelings in determining the value of various experiences. If one lives according to one's organismic valuing process, one is a fully functioning person and is living an authentic life. Unfortunately, because humans have a need for positive regard, they often allow other people in their lives to place conditions of worth on them. When conditions of worth replace the organismic valuing process as a frame of reference for living one's life, the person becomes incongruent and lives an inauthentic life.

Existential and humanistic psychology share the beliefs that: humans possess a free will and are therefore responsible for their actions; phenomenology is the most appropriate method for studying humans; humans must be studied as whole beings; the search for meaning is the most important human motive; all humans should aspire to live authentic lives; and, because humans are unique, traditional scientific methodology cannot be used effectively to study them. The major difference between existential and humanistic psychology is that the latter views human nature as basically good, whereas existential psychologists do not believe we have an innate guidance system. Existential psychologists see freedom as a curse as well as a blessing and something from which most humans attempt to escape.

Humanistic psychology has been criticized for offering a description of humans more positive than the facts warrant, and for minimizing or ignoring the positive contributions of behaviorism and psychoanalysis. Humanistic psychology's major contribution has been to expand psychology's domain by urging that all aspects of humans be investigated and that psychology's conception of science be changed to allow objective study of uniquely human attributes. Recently the field of positive psychology has emerged, studying positive human attributes but doing so in a manner more scientifically rigorous than was often the case with traditional humanistic psychology. However, both traditional humanistic psychology and positive psychology insist that mental health is more than the absence of mental illness. Both describe the truly healthy person as living an exciting, meaningful life.

DISCUSSION QUESTIONS

1. What is third-force psychology? What did the third-force psychologists see as the limitations of the other two forces?
2. Describe Brentano's phenomenology. What did he mean by *intentionality*? What did Husserl mean by *pure phenomenology*?
3. How did Heidegger expand phenomenology? Discuss the following terms and concepts from Heidegger's theory: *Dasein*, *authenticity*, *becoming*, and *thrownness.*
4. Describe Binswanger's method of Daseinanalysis. Discuss the following terms and concepts from Binswanger's theory: *Umwelt*, *Mitwelt*, *Eigenwelt*, *world-design*, *ground of existence*, and *being-beyond-the-world.*
5. In May's theory, what is the relationship between anxiety and guilt? What is the difference between normal anxiety and neurotic anxiety?
6. What, according to May, is the human dilemma?
7. For May, what functions do myths provide in human existence? What determines the content of classical myths? Are some myths better than others?
8. Describe the relationship between May's belief in the importance of myth in living one's life and contemporary narrative therapy.
9. Why did Kelly maintain that all humans are like scientists?
10. Describe Kelly's approach to psychotherapy. What did Kelly mean when he said that psychological problems are perceptual problems? What techniques did Kelly use to help his clients regain their ability to make-believe?
11. What are the main tenets of humanistic psychology?
12. Summarize Maslow's hierarchy of needs.
13. Why, according to Maslow, are self-actualizing people so rare? List what Maslow found to be the characteristics of self-actualizing people.
14. Describe what Maslow meant by transpersonal psychology.
15. How did Rogers attempt to measure the effectiveness of psychotherapy?
16. For Rogers, what constitutes an incongruent person? In your answer, include a discussion of the organismic valuing process, the need for positive regard, and conditions of worth.
17. According to Rogers, what are the three major components of any relationship that facilitate personal growth?
18. What are the similarities and differences between humanistic and existential psychology?
19. Summarize the criticisms and contributions of humanistic psychology.
20. Compare the contemporary field of positive psychology with traditional humanistic psychology.

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GLOSSARY

Absurd The existential idea that the search for an inherent meaning in life is futile.

Anxiety The feeling that results when one confronts the unknown, as when one contemplates death or when one's choices carry one into new life circumstances. According to existentialists, one cannot live an authentic life without experiencing anxiety.

Authentic life According to existentialists, the type of life that is freely chosen and not dictated by the values of others. In such a life, one's own feelings, values, and interpretations act as a guide for conduct.

Becoming A characteristic of the authentic life because the authentic person is always becoming something other than what he or she was. Becoming is the normal, healthy psychological growth of a human being.

Being-beyond-the-world Binswanger's term for becoming. The healthy individual always attempts to transcend what he or she is.

Being motivation For Maslow, the type of motivation that characterizes the self-actualizing person. Because being motivation is not need-directed, it embraces the higher values of human existence, such as beauty, truth, and justice. (Also called B-motivation.)

Being perception Perception that embraces fully "what is there" because it is not an attempt to locate specific items that will satisfy needs. (Also called B-perception.)

Binswanger, Ludwig (1881–1966) Applied Heidegger's existential philosophy to psychiatry and psychology. For Binswanger, a prerequisite for helping an emotionally disturbed person is to determine how that person views himself or herself and the world. (*See also* **Daseinanalysis** and **World-design**.)

Camus, Albert (1913–1960) A French writer who won the Nobel Prize for his works in existential psychology and political science.

Conditions of worth According to Rogers, the conditions that the relevant people in our lives place on us and that we must meet before these people will give us positive regard.

Construct systems According to Kelly, the collection of personal constructs with which people make predictions about future events.

Constructive alternativism Kelly's notion that it is always possible to view ourselves and the world in a variety of ways.

Daimonic According to May, any human attribute or function that in moderation is positive but in excess is negative.

Dasein Heidegger's term for "being-in-the-world." The world does not exist without humans, and humans do not exist without the world. Because humans exist in the world, it is there that they must exercise their free will. Being-in-the-world means existing in the world, and existing means interpreting and valuing one's experiences and making choices regarding those experiences.

Daseinanalysis Binswanger's method of psychotherapy that requires that the therapist understand the client's worldview. Daseinanalysis examines a person's mode of being-in-the-world.

Deficiency motivation According to Maslow, motivation that is directed toward the satisfaction of some specific need. (Also called D-motivation.)

Eigenwelt Binswanger's term for a person's private, inner experiences.

Existential psychology The brand of contemporary psychology that was influenced by existential philosophy.

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The key concepts in existential psychology include freedom, individuality, responsibility, anxiety, guilt, thrownness, and authenticity.

Fixed-role therapy Kelly's brand of therapy whereby he would assign a role for his clients to play that was distinctly different from the client's self-characterization. With this type of therapy, the therapist acts much like a supporting actor. (*See also* **Self-characterization**.)

Flourishing According to positive psychologists, the state of being free from mental illness and also living an enthusiastic, meaningful, and effective life.

Ground of existence Binswanger's term for the circumstances into which a person is thrown and according to which he or she must make choices. (Also called facticity.) (*See also* **Thrownness**.)

Guilt The feeling that results most intensely from living an inauthentic life.

Heidegger, Martin (1889–1976) Expanded Husserl's phenomenology to include an examination of the totality of human existence.

Hierarchy of needs Maslow's contention that human needs are arranged in a hierarchy and that lower needs in the hierarchy must be adequately satisfied before attention can be focused on higher needs. The most basic and powerful needs in the hierarchy are physiological needs, and then come safety needs, needs for belonging and love, and the need for self-esteem. When all lower needs in the hierarchy are adequately satisfied, a person becomes self-actualizing.

Human dilemma According to May, the paradox that results from the dual nature of humans as objects to which things happen and as subjects who assign meaning to their experiences.

Humanistic psychology The branch of psychology that is closely aligned with existential psychology. Unlike existential psychology, however, humanistic psychology assumes that humans are basically good. That is, if negative environmental factors do not stifle human development, humans will live humane lives. Humanistic psychology is concerned with examining the more positive aspects of human nature that behaviorism and psychoanalysis had neglected. (Also called third-force psychology.)

Inauthentic life A life lived in accordance with values other than those freely and personally chosen. Such a life is characterized by guilt.

Incongruent person Rogers's term for the person whose organismic valuing process is replaced by conditions of worth as a guide for living.

Intentionality Brentano's contention that every mental act refers to something external to the act.

Jonah complex According to Maslow, the fear of one's own potential greatness.

Kelly, George (1905–1967) Emphasized that it is always possible to construe one's self and the world in a variety of ways. For Kelly, psychological problems are essentially perceptual problems.

Maslow, Abraham (1908–1970) A humanistic psychologist who emphasized the innate human tendency toward self-actualization. Maslow contended that behaviorism and psychoanalysis provided only a partial understanding of human existence and that humanistic, or third-force, psychology needed to be added to complete our understanding.

May, Rollo (1909–1994) Psychologist who was instrumental in bringing European existential philosophy and psychology to the United States.

Merleau-Ponty, Maurice (1908–1961) A French academic psychologist known for his existential phenomenology. Modern phenomenological psychology is often derived from his methods.

Mitwelt Binswanger's term for the realm of social interactions.

Narrative therapy Examines the stories by which people live and understand their lives and, where necessary, encourages the replacement of ineffective stories with effective ones.

Need-directed perception Perception whose purpose is to locate things in the environment that will satisfy a need. (Also called deficiency perception or D-perception.)

Need for positive regard According to Rogers, the need for positive responses from the relevant people in one's life.

Neurotic anxiety The abnormal fear of freedom that results in a person living a life that minimizes personal choice.

Normal anxiety Results from living an authentic life. (*See also* **Authentic life**.)

Ontology The study of the nature of existence.

Organismic valuing process According to Rogers, the innate, internal guidance system that a person can use to "stay on the track" toward self-actualization.

Phenomenology The introspective study of intact, mental experiences.

Positive psychology Field in contemporary psychology that explores the positive attributes of humans but does so in a more scientifically rigorous and less self-centered way than was often the case with traditional humanistic psychology.

Propositional thinking According to Kelly, the experimentation with ideas to see where they lead.

Pure phenomenology The methodology proposed by Husserl to discover the essence of those mental acts and processes by which we gain all knowledge.

Responsibility A necessary by-product of freedom. If we are free to choose our own existence, then we are completely responsible for that existence.

Rogers, Carl (1902–1987) A humanist psychologist whose nondirective and then client-centered psychotherapy was seen by many as the first viable alternative to psychoanalysis as a method for treating troubled individuals. Like Maslow's, Rogers's theory of personality emphasized the innate tendency toward self-actualization. According to Rogers, a person continues toward self-actualization unless his or her organismic valuing process is displaced by conditions of worth as a guide for living. The only way to avoid creating conditions of worth is to give a person unconditional positive regard. (*See also* **Conditions of worth**, **Organismic valuing process**, **Self-actualization**, and **Unconditional positive regard**.)

Sartre, Jean-Paul (1905–1980) A French philosopher with interests in psychology. His existential writings earned him a Nobel Prize.

Self-actualization According to Rogers and Maslow, the innate human tendency toward wholeness. The self-actualizing person is open to experience and embraces the higher values of human existence.

Self-alienation According to existentialists, the condition that results when people accept values other than those that they attained freely and personally as guides for living.

Self-characterization The self-description that Kelly required of many of his clients before beginning their therapeutic program.

Shut-upness Kierkegaard's term for the type of life lived by a defensive, inauthentic person.

Subjective reality A person's consciousness.

Third-force psychology *See* **Humanistic psychology.**

Thrownness According to Heidegger and Binswanger, the circumstances that characterize a person's existence that are beyond the person's control. (*See also* **Ground of existence**.)

Transpersonal psychology Maslow's proposed fourth force in psychology that stresses the relationship between the individual and the cosmos (universe) and in so doing focuses on the mystical and spiritual aspects of human nature.

Umwelt Binswanger's term for the physical world.

Unconditional positive regard According to Rogers, the giving of positive regard without any preconditions.

World-design (*Weltanschauung*) Binswanger's term for a person's basic orientation toward the world and life.

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18

Psychobiology

Psychobiology attempts to explain psychological phenomena in terms of their biological foundations. The search for the biological foundations of behavior has been a recurring theme in the history of psychology and has been represented by such individuals as Hippocrates, Aristotle, Galen, Hartley, Bain, Weber, Fechner, Helmholtz, Pavlov, and Freud.

Most of Chapter 8 focused upon the relationship between physiology and psychology—especially the question of localization. Chapter 10 (Darwin and Galton) foreshadowed modern interests in behavioral genetics, and both localization and genetics will be reprised in this chapter. Another foundational matter in the biology of behavior was understanding neurons and the nervous system. The German researcher Wilhelm von Waldeyer introduced the term *neuron* in 1891. Advances were soon made by the Italian physician Camillo Golgi and the Spanish scientist Santiago Ramon y Cajal. The two would share the 1906 Nobel Prize in physiology or medicine for their efforts. Our contemporary understanding also owes to two other Nobel Prize winners: the Englishman Sir Charles Sherrington, who won the award in 1932, and the German Otto Loewi, who won in 1936. Both men paved the way for work in neurotransmission and neurotransmitters. Modern pharmacology, especially psychopharmacology—including the treatment of depression, anxiety, and psychosis with drugs, would not be possible without their contributions.

Because radical behaviorism discouraged a search for any internal causes of behavior, as its influence diminished there arose a resurgence of interest not only in cognitive psychology (see Chapter 19) but in this burgeoning neuroscience as well. Our brief look at psychobiological research begins with the pioneering work of Karl Lashley as well as some of the illustrious psychobiologists he influenced.

KARL S. LASHLEY

Karl Spencer Lashley (1890–1958) was born in Davis, West Virginia, an only child. His father was a businessman and politician, his mother a schoolteacher. Lashley received his undergraduate education at West Virginia University and his Masters in bacteriology at the University of Pittsburgh. From there, he went to Johns Hopkins University, where he received his PhD in genetics in 1914. As one of his students, Frank Beach (1961, p. 163), quipped, he was an "*eminent psychologist with no earned degree in psychology*."

Nevertheless, while at Johns Hopkins, Lashley came under the influence of John Watson, and much of Lashley's early work reflected Watson's ideas, as you may recall from Chapter 12. Lashley's formal collaboration with Watson eventually ended because Lashley was interested in seeking the neurophysiological bases of conditioned reflexes and Watson was not. Although the two went their separate ways professionally, they remained friends.

Lashley next collaborated with Shepard Ivory Franz (1874–1933; APA President in 1920), another patriarch of U.S. physiological psychology. Using Thorndike's training methods, Franz would then surgically ablate animals to explore the relationship between learning and various regions of the brain. In 1917 Lashley went to the University of Minnesota and then, in 1926, to the University of Chicago. In 1935 Lashley moved to Harvard, and in 1942 he became director of the Yerkes Laboratories of Primate Biology in Orange Park, Florida (because Yerkes Laboratories was supervised by Harvard, Lashley remained affiliated with that university). Although Lashley retired as director of Yerkes Laboratories in 1955, he remained on the board of directors until his death in 1958, while vacationing in France.

Karl S. Lashley

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As mentioned, Lashley was initially an adherent of Watsonian behaviorism, and he sought to support the associationism on which it was based with neurophysiological evidence. But time after time, Lashley was frustrated in his efforts to show that the brain worked like a complex switchboard linking sensory impulses to motor reactions. Contrary to his original intention, Lashley gradually showed that brain activity was more like the Gestaltists' description than like the behaviorists'. He found no evidence that stimulation of specific areas of the brain is associated with the elicitation of specific responses.

Lashley made two major observations that were contrary to his switchboard conception of the brain. One was that loss of ability following destruction of parts of the cortex is related more to the *amount* of destruction than to the *location* of destruction. This finding, called **mass action**, indicated that the cortex works as a unified whole, as the Gestaltists had maintained.

The second observation was that any part of a functional area of the brain can perform the function associated with that area. For example, within the visual area of the cortex, any of the cells within that area allow vision to occur. To destroy a brain function, then, the entire brain area associated with that function would need to be destroyed. If any part of the area were spared, the function would still be maintained. Lashley called this second observation **equipotentiality**, and it too supported the contention that the brain acted as an integrated

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whole and not as a mechanistic switchboard. The research from which the principles of mass action and equipotentiality were derived, and much of Lashley's additional creative research, is summarized in Beach, Hebb, Morgan, and Nissen (1960).

In Search of the Engram

The **engram** is the neurophysiological locus of memory and learning. Lashley spent decades in search of the engram (the title of one of his major papers) and in the end expressed his frustration in that same article as follows:

> This series of experiments has yielded a good bit of information about what and where the memory trace is not. It has discovered nothing directly of the real nature of the engram. I sometimes feel, in reviewing the evidence on the localization of the memory trace, that the necessary conclusion is that learning is just not possible. (1950, pp. 477–478)

This frustration was not new. Compare Lashley's conclusion with that of Cicero (106–43 B.C.):

> But for my part I wonder at memory in a still greater degree. For what is it that enables us to remember, what character has it, or what is its origin? … Do we think there is … a sort of roominess into which the things we remember can be poured as if into a kind of vessel? … Or do we think that … memory consists of the traces of things registered in the mind? What can be the traces of words, of actual objects, what further could be the enormous space adequate to the representation of such a mass of material? (King, 1927, p. 80)

Has the search for the engram been more successful since Lashley's efforts? Not according to Finger (1994):

> In spite of the best efforts of some of the brightest scientists, the nature and locus of the engram have remained as elusive and mysterious to twentieth-century investigators as they were to Cicero and other philosophers and naturalists who pondered the characteristics of the memory trace long ago. (p. 346)

Concerning Lashley's place in the history of psychology, Robinson says, "If we were to summarize [Lashley's] role in twentieth-century developments in physiological psychology, we might say that he bore the same relationship to the Pavlovians that Flourens bore to the phrenologists" (1986, p. 421). In Chapter 8, we saw that Flourens's research demonstrated that the cortex is not characterized by localization of function, as the phrenologists had assumed, but functions as a unit. The Pavlovians (and Watson) assumed a different type of localization—an association between certain sensory centers and certain motor centers in the brain—and Lashley's work showed that this type of localization does not exist either.

In 1929 Lashley, then president of the APA, gave an address to the International Congress of Psychology meeting in New Haven describing his research on brain functioning. Also in 1929, Lashley published his influential book *Brain Mechanisms and Intelligence*. Because of Lashley's prestige and because his findings were generally supportive of Gestalt theory, his address did much to promote the acceptance of Gestalt psychology and in time, cognitive neuroscience (see Gardner, 1985; for research details, Lashley, Chow, & Semmes, 1951).

Both Lashley's work with animals and his search for the engram continued through many of his students. For example, Robert Thompson, who studied with Lashley at Yerkes, and James McConnell did controversial (and somewhat morbidly amusing) memory trace research using classically conditioned planarians. Also while at Yerkes, Lashley influenced a local neurosurgeon, Karl Pribram, to abandon his medical practice for a career in research. Pribram's subsequent collaboration with George Miller (Chapter 19) would in turn become foundational for information processing psychology and his theories of brain function would help shape the new field of cognitive neuroscience. The aforementioned Frank Beach, a Lashley PhD from his stint

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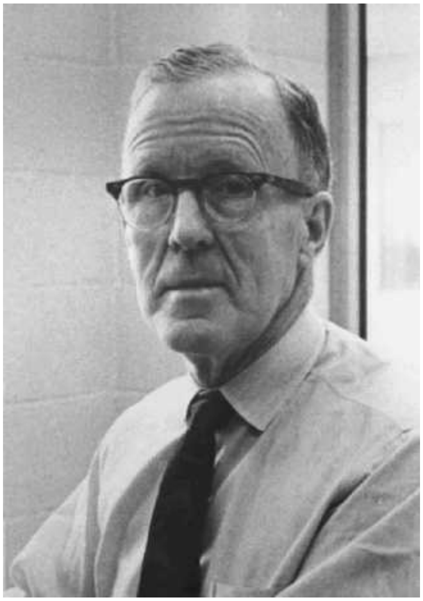
at Chicago, would make his mark in the study of sexual behavior, and as a critic of comparative psychology's reliance on the white lab rat (Beach, 1950). It was the colorful Beach who perhaps best captured Lashley with the observation that his mentor was a "famous theorist who specialized in disproving theories, including his own."

DONALD O. HEBB


Chris F. Payne/McGill University Archives, PR000387

Donald O. Hebb

Donald Olding Hebb (1904–1985) was born in Chester, Nova Scotia. Both of his parents were medical doctors. He received his BA from Dalhousie University with the lowest grade average a person could have and still graduate. After teaching for a while, he entered McGill University as a graduate student in psychology in spite of his poor undergraduate performance (presumably because the chair of the psychology department at McGill was a friend of Hebb's mother). Hebb studied Pavlovian psychology at McGill and was convinced of its value. After receiving his master's degree from McGill in 1932, he continued his education at the University of Chicago, where he worked with Lashley and took a seminar from Köhler. Hebb's initial concurrence with Pavlovian psychology was converted into outright opposition: "I had all the fervor of the reformed drunk at a temperance meeting; having been a fully convinced Pavlovian, I was now a fully convinced Gestalter-cum-Lashleyan" (Hebb, 1959, p. 625). In 1935 Lashley accepted a professorship at Harvard and invited Hebb to go with him. In 1936 Hebb obtained his PhD from Harvard and remained there for an additional year as a teacher and research assistant.

In 1937 Hebb went to the Montreal Neurological Institute to work with the illustrious brain surgeon Wilder Penfield. Hebb's job was to evaluate Penfield's patients after brain surgery. Hebb consistently found little or no loss of intelligence, even after substantial loss of tissue from the frontal lobes of the brain. After five years of such observations (1937–1942), Hebb reached a conclusion about intelligence that was to guide much of his later work: "Experience in childhood normally develops concepts, modes of thought, and ways of perceiving that constitute intelligence. Injury to the infant brain interferes with that process, but the same injury at maturity does not reverse it" (1980, p. 292).

In 1942, when Lashley accepted his appointment as director of the Yerkes Laboratories, Hebb joined him there and remained for five years. In 1948 Hebb became professor of psychology at McGill University, where he remained until his retirement. After retiring, Hebb moved back to a small farm near Chester, Nova Scotia, where he was born. He remained physically and psychologically active until he died in 1985, following what was thought to be routine hip surgery (Beach, 1987).

Among Hebb's many honors were the presidency of the Canadian Psychological Association (1952), the presidency of the APA (1960), and recipient of the Distinguished Scientific Contribution Award of the APA (1961).

Cell Assemblies and Phase Sequences

According to Hebb, the neural interconnections in a newborn's brain are essentially random. It is experience that causes this network of neurons to

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become organized and provide a means of effectively interacting with the environment. Hebb speculated that every environmental object we experience fires a complex package of neurons, called a **cell assembly**. When we look at a pencil, for example, our attention shifts from the point, to the shaft, to the eraser. Each shift of attention causes different neurons to fire, and, at first, these neurons fire independently of the others. Eventually, however, because the neurons stimulated by the presence of a pencil fire either simultaneously or in close succession, they become a neurological package corresponding to the experience of a pencil. According to Hebb, it is *reverberating neural activity* that allows neurons that were temporarily separated to become associated. For example, the neurons activated by observing a pencil's point become associated with the neurons activated by observing a pencil's eraser, although the observations do not occur at exactly the same time. Hebb believed that neural activity caused by stimulation continued for a short time after the stimulation ceases (reverberating neural activity), thus allowing the development of successive neural associations. Once a cell assembly exists, it can be fired by internal or external stimulation or by a combination of the two. When a cell assembly fires, we experience the thought of the environmental object or event to which the assembly corresponds. For Hebb, the cell assembly was the neurological basis of a thought or an idea. In this way, Hebb explained why environmental objects do not need to be present for us to think about them.

Just as the various neurons stimulated by an object become neurologically interrelated to form a cell assembly, so do cell assemblies become neurologically interrelated to form **phase sequences**. Hebb (1959) defined a phase sequence as "a temporally integrated series of assembly activities; it amounts to one current in the stream of thought" (p. 629). Like a cell assembly, a phase sequence can be fired by internal or external stimulation or by a combination of the two; when one or more assemblies in a phase sequence fire, the entire phase sequence tends to fire. When the entire phase sequence fires, a stream of thought—a series of ideas arranged in some logical order—is experienced. Hebb (1972) gave the following example:

> Cell-assemblies that are active at the same time become interconnected. Common events in the child's environment establish assemblies, and then when these events occur together the assemblies become connected (because they are active together). When the baby hears footsteps, let us say, an assembly is excited; while this is still active he sees a face and feels hands picking him up, which excites other assemblies—so the "footsteps assembly" becomes connected with the "face assembly" and the "being-picked-up assembly." After this has happened, when the baby hears footsteps only, all *three* assemblies are excited; the baby then has something like a perception of the mother's face and the contact of her hands before she has come in sight—but since the sensory stimulations have not yet taken place, this is ideation or imagery, not perception. (p. 67)

According to Hebb, childhood learning involves the slow buildup of cell assemblies and phase sequences, and this kind of learning can be explained using associationistic terminology. Adult learning, however, is characterized by insight and creativity and involves the rearrangement of already existing cell assemblies and phase sequences. Although childhood learning can be explained in terms of associationistic principles, adult learning is better explained in terms of Gestalt principles. As we will see in the next chapter, Hebb's contention that neurons that are active together become associated came to be called Hebb's rule and was instrumental in the development of a powerful and influential form of artificial intelligence (AI), connectionism (see Rumelhart, McClelland, & the PDP Research Group, 1986).

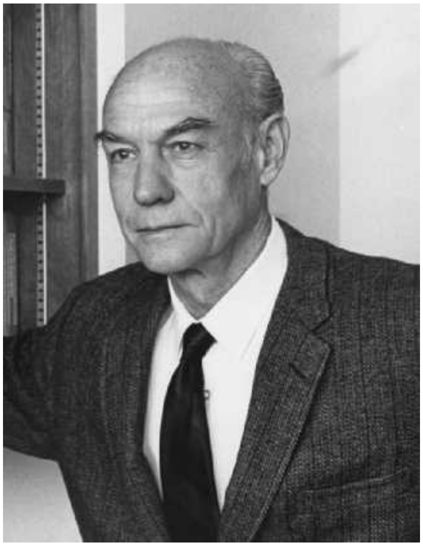
Beyond these works, Hebb also authored many other signal publications in psychobiology. For example, in 1946 he published an article summarizing his research on the nature of fear. In 1949 he described the results of a study in which animals were reared in either an enriched or an impoverished sensory environment. He found that animals reared in an enriched sensory environment were relatively better learners as adults. In a series of experiments run under his supervision, the effects of sensory deprivation on cognitive processes were examined (for example, see Heron, 1957). In 1955 Hebb reported research showing the relationship between level of activity in the small brain structure, called the reticular activating system (RAS), and cognitive and behavioral performance. The examination of this relationship was called *arousal theory*. It was while they were doing research on arousal theory in Hebb's laboratory that James Olds and Peter Milner discovered reinforcement centers in the brain (Olds & Milner, 1954). Buchtel (1982) provides an excellent sample of Hebb's influential articles on topics in psychobiology, and a complete list of Hebb's more than 80 publications is provided.

ROGER W. SPERRY

Roger Wolcott Sperry (1913–1994) was born in Hartford, Connecticut. He received his BA in English from Oberlin College in 1935 and his PhD in zoology from the University of Chicago in 1941, where he learned neurosurgical techniques from the eminent neuroembryologist Paul Weiss. After receiving his doctorate, Sperry studied with Lashley at the Yerkes Laboratories in Florida (1942–1946). In 1946 he returned to the University of Chicago first as an assistant professor of anatomy and then, in 1952, as assistant professor of psychology. In 1954 Sperry moved to the California Institute of Technology in Pasadena (Caltech) as the prestigious Hixon Professor of Psychobiology.

The Split-Brain

At Caltech, Sperry pursued his interest in the routes by which information is transferred from one side of the cerebral cortex to the other. In a now-famous series of experiments, Sperry and his colleagues discovered two possible routes for such interhemispheric transfer—the corpus callosum (a large mass of fibers that connects the two halves of the cortex) and the optic chiasm. The optic chiasm is the point in the optic nerve where information coming from one eye is projected to the side of the cortex opposite to that eye. Sperry taught cats and monkeys to learn a visual discrimination with a patch over one eye. He then tested for transfer by switching the patch to the other eye and found complete interocular transfer. Sperry then began his search for the mechanism by which information is transferred from one side of the cortex to the other. He found that ablating either the corpus callosum or the optic chiasm alone or together *after* training did not interfere with transfer. He also found that ablating either the corpus callosum or the optic chiasm *before* training did not interfere with transfer. However, he found that ablating both the corpus callosum and the optic chiasm before training eliminated interhemispheric transfer. Thus, ablating the corpus callosum and the optic chiasm had in essence created two separate brains with no exchange of information between them. For example, when an animal's brain was split in the manner just described and it was taught to make a visual discrimination


Courtesy of the Archives, California Institute of Technology

Roger W. Sperry

with a patch over one eye, it had no recollection of that learning when tested with the other eye (Sperry, 1961, 1964). A brain that has had its corpus callosum and its optic chiasm ablated is referred to as a **split-brain preparation**.

Sperry and his colleagues, Joseph Bogen and Philip Vogel, discovered that humans suffering from severe drug-resistant, intractable epilepsy could benefit from having their brains split in the manner described above. Presumably, with split-brain preparation, a seizure begun in one hemisphere would not have a mechanism available to spread its influence to the other hemisphere and thus increase its intensity. In many cases, patients treated in this way improved enough to leave the hospital. In everyday living, these "split-brain" patients showed almost no abnormality in spite of their radical surgery.

Sperry and his colleagues developed a number of tests that made it possible to study the function of each cerebral hemisphere independently of the other. Although Paul Broca and others had provided information indicating hemispheric specificity as early as 1831 (see Chapter 8) and speculation concerning hemispheric specificity was quite popular toward the end of the 19th century (see, for example, Brown-Sequard, 1874a, 1874b, 1890), information concerning hemispheric specificity remained extremely limited. The additional knowledge provided by Sperry and his colleagues was dramatic. They found that each hemisphere had its own characteristic range of cognition, memory, emotion, and consciousness (see, for example, Gazzaniga, 1970). Under Sperry's leadership, research on the "left brain" and the "right brain" became very popular (see, for examples, Springer & Deutsch, 1985, or Zaidel, 1994).

Unfortunately, some speculations concerning hemispheric specificity began to exceed the facts. For example, it was speculated that some people are right-brain dominated and others left-brain dominated and that tests could be devised that reveal this domination. It was also speculated that educational practices could be employed to specifically enhance either right- or left-brain functions. The belief that the two cortical hemisphere can be educated independently goes back at least as far as Brown-Sequard (1874a, 1874b) and in one form or another, has been entertained ever since. Jerre Levy, another one-time colleague of Sperry, attempted to set the record straight in her article "Right Brain, Left Brain: Fact and Fiction" (1985). In this article, Levy emphasizes the point that in people with normal brains, the contributions of the two hemispheres to thought and behavior are inseparable. Levy concludes, "The popular myths are misinterpretations and wishes, not the observations of scientists. Normal people have not half a brain nor two brains but one gloriously differentiated brain, with each hemisphere contributing its specialized abilities.… We have a single brain that generates a single mental life" (1985, p. 44).

At least as early as Fechner, there had been philosophical speculation about how the two hemispheres related to conscious experience. Sperry's work certainly energized such questions (for a fascinating example, see Jaynes, 1976). Sperry himself had a lifelong interest in the mind–body (brain) problem and how that problem relates to human values, and many of his publications, especially his later ones, reflected those interests (see, for example, Sperry, 1970, 1980, 1982, 1988, 1991, 1992, 1993). Sperry believed that consciousness emerges from brain processes and, once emerged, has a causal relationship to behavior. Thus, Sperry was an interactionist concerning the mind–body relationship. He believed (some say, as we will see in Chapter 19, incorrectly) that by correlating mental events directly to brain processes, he avoided dualism. In his Nobel address, Sperry (1982) said,

> [I]t remains to mention briefly that one of the more important indirect results of the split-brain work is a revised concept of the nature of consciousness and its fundamental relation to brain processing.… The key development is a switch from prior non-causal, parallelist views to a new causal, or "interactionist" interpretation that ascribes to inner experience an integral causal control role in brain function and behavior. In effect, and without resorting to dualism, the mental forces of the conscious mind are restored to the brain of objective

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> science from which they had long been excluded on materialist-behaviorist principles. (p. 1226)

In his lifetime, Sperry published almost 300 articles in the most prestigious journals, and many of those articles were widely translated (Puente, 1995). Among the many honors received by Sperry were the Karl Lashley Award of the American Philosophical Society (1976); the Wolf Prize in Medicine (1979); the Ralph Gerard Award from the Society of Neuroscience (1979); the Nobel Prize (1981; shared with Harvard neuroscientists David Hubel and Torsten Wiesel); and the Lifetime Achievement Award from the APA (1993).

Sperry died in 1994, in Pasadena, California, at the age of 80, from a degenerative neuromuscular disorder.

At this point we have now mentioned the Nobel Prize in physiology or medicine several times (including Pavlov's award). As seen, research related to psychology has won this prestigious award on occasion. Additional examples include Egas Moniz (1949) for his work on the lobotomy, and Georg von Bekesy (1961) for his work on hearing. In the previous chapter we noted the works of Sartre and Camus, who won the Nobel Prize in literature for their existential writings. The Nobel Prize in Economics has also been awarded to two cognitive scientists, Herbert Simon (1978) and Daniel Kahneman (2002), both of whom we will cover in Chapter 19. Freud was nominated 11 times, but never won (and the award is not given posthumously). For more on psychology and the Nobel Prize, including Münsterberg's attempt to have Wundt receive the award, see Benjamin (2003).

EVOLUTIONARY APPROACHES

In 1973, the Nobel Prize in physiology or medicine was shared by three men who were all associated with the field of ethology—or the study of animal behavior. These men were Karl von Frisch (1886–1982) and **Konrad Lorenz (1903–1989)** in Germany, and **Niko Tinbergen (1907–1988)** in England. The work of von Frisch dealt with perception and communication in bees, but both Lorenz and Tinbergen would have an even more direct connection to psychology.

Ethology

Under the influence of radical behaviorism, reference to all internal events as explanations of behavior was actively discouraged. This positivistic philosophy discouraged the study not only of cognitive and physiological processes but also of instinctive behavior. As with cognitive and physiological explanations of behavior, however, instinctive explanations were discouraged, but not eliminated. Even during behaviorism's heyday, the ethologists were studying instinctive animal behavior. **Ethology** (*ethos* = habit, custom, character; *ology* = the study of) is usually defined as a branch of zoology, although contemporary ethologists are just as likely to be found in psychology programs.

Tinbergen would become famous for his work with stickleback fish and herring gulls, as well as for articulating the original four aims of the ethological approach. Those aims were to understand the function, ontogeny, causation, and evolution of any given behavior. For details concerning Tinbergen's colorful life and his accomplishments, see Dewsbury (2006). Lorenz is most associated with the study of imprinting in geese, and for his ethological approach to topics in social psychology, such as aggression. For more about Lorenz, see Bateson (1990).

Comparative studies of animal behavior had been popular among the functionalists (recall Yerkes, Hunter, etc) as a means of exploring the adaptive development of key phenomena, such as learning and intelligence. Under the behaviorists, the use of animals was even more wide spread, but primarily for reasons of scientific expediency instead of any interest in the animals themselves. As Lyman-Henley and Henley (2000) note, it was only the ethologists then that were interested in animal behavior per se. Burghardt (1973) describes

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Max Planck Society

Nobel Prize winners Niko Tinbergen at left, and Konrad Lorenz at right

the "ethological attitude" as the insistence of ethologists to adhere to the following five points within an evolutionary perspective:

(1) study meaningful behaviors in the context of an animal's natural existence
(2) begin with descriptive studies
(3) study a wide range of species
(4) compare similar behaviors in closely related species
(5) avoid the exclusive use of domesticated or laboratory animals

As such, ethologists frequently explore a specific category of behavior (such as aggression, migration, communication, territoriality) in an animal's natural environment and attempt to explain that behavior in terms of evolutionary theory. Of major importance to the ethologists is **species-specific behavior**, or how members of various species typically behave under certain environmental conditions. The nativistic position of the ethologists placed them in direct conflict with the behaviorists, especially the radical behaviorists:

> In those early days, the 1950s, the argument was basically European *vs*. American, biologists *vs*. psychologists, instinct theorists *vs*. learning theorists, birdwatchers *vs*. ratrunners. The lines were clearly drawn. The Europeans, calling themselves *ethologists*, rallied behind the flamboyant Lorenz, who dismissed the Americans as "ratrunners, unprepared to ask important questions." The ethologists stated flatly that the most important question was: How much is

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> behavior due to instinct (genetics) and how much to learning? They suspected that instinct was far more important than anyone had previously imagined. (Wallace, 1979, p. 2)

The ethologists effectively battled the behaviorists, and their success had much to do with the decline in the popularity of radical behaviorism. Today, ethology remains an active field of study (for examples see Burghardt, 2005; Herzog, 2010; Ristau, 1991), but eventually the main influence of evolutionary theory upon psychology came through sociobiology (for example, Dawkins, 1976).

Sociobiology

Edward O. Wilson (1929–), the founder of sociobiology, was born and initially educated in Alabama. As a PhD student at Harvard in 1953, Wilson took a course from Lorenz and the influence of ethology on sociobiology is considerable. A major difference is that sociobiologists tend to concentrate on the social behavior that results from the complex interactions between an organism's biology (initially Wilson studied ants) and its environment. Rather than studying stereotyped behavior, sociobiologists employ notions such as *strategy* and *cost-benefit analysis*. Sociobiologists believe that an organism takes the course of action that will increase the probability that copies of its genes will be perpetuated into future generations.

Although in Chapter 10 we briefly reviewed **sociobiology** as an example of neo-Darwinism, we expand that coverage here because sociobiology nicely exemplifies the connection between behavioral genetics and contemporary psychology. According to Barash (1979), humans possess a **biogrammar** that structures our social behavior, just as the innate rules of grammar structure our verbal behavior (Chomsky, Chapter 19). We learn a language, create culture, protect our territory, and learn some things (such as phobias and societal rules) more readily than others because we are genetically disposed to do so.

Similarly, the male strategy for perpetuating copies of his genes is promiscuity, and the female strategy is the careful selection of an adequate mate (Buss & Barnes, 1986). This sex difference in strategy, according to the sociobiologists, is because the male investment in reproduction is minimal and the female investment is substantial. Wallace (1979) wryly describes copulation from the male perspective: "A male can make up the energy expended in a sexual episode by eating a grape. His cost is low, and—who knows?—perhaps it will result in a child for him" (p. 74). However, if pregnancy results from copulation, the cost to the female is much greater. As Barash (1979) explains,

> Eggs are fertilized by sperm, not vice versa. And women become pregnant, not men. It is the woman who must produce a placenta and nourish her unborn child; who must undergo the metabolic and hormonal stresses of pregnancy; who must carry around an embryo that grows in bulk and weight, making her more and more ungainly as her pregnancy advances; and who, when the child is born, must nurse it. (p. 47)

As a result, females are genetically predisposed to seek males with good (fitness enhancing) genes (those that will produce an offspring with survival and reproductive potential), good resources (for example, food, territory, shelter, and protection), and good behavior (a willingness to invest some of their resources in the female and her offspring).

Some have accused the sociobiologists of being rigid biological determinists, but this is not an entirely accurate assessment. For example, in the case of mate selection just described, the sociobiologists describe only general genetic dispositions. They say that males have a genetic predisposition to be promiscuous, but they say more. In cultures where polygyny is practiced (where males are allowed to mate with more than one female), males have no need to inhibit their tendency toward promiscuity. In monogamous cultures, however, such promiscuity is considered adulterous and is discouraged. The social behavior of any individual, then, always results from the combined influences of biology *and* culture. In explaining human behavior, the sociobiologists avoid "nothing-butism"—that is, claiming that behavior

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is caused *only* by biological factors or that it is caused *only* by environmental (cultural) factors. For them it is always both. Barash (1979) says, "For too long social science and biological science have pursued 'nothing but' approaches. Sociobiology may just help redress that imbalance" (p. 45).

The interactive approach just described is nicely illustrated by Wilson's **leash principle**. According to Wilson, humans have a biological (genetic) predisposition to create culture because to do so facilitates survival. Therefore, there is, or should be, a close relationship between culture and the satisfaction of biological needs. If culture strays too far from biology, the leash holding the two together would become too taut and "personalities would quickly dissolve, relationships disintegrate, and reproduction cease" (Wilson, 1978, p. 22). Obviously, if this continued, the culture would become extinct. Before this happens, however, cultures usually adjust in the direction of biology.

According to sociobiology, then, our biogrammar furnishes us with *tendencies* to engage in certain social activities. For the title of his book *The Whisperings Within* (1979), Barash chose the term *whisperings* because a whisper is a whisper; it is not a shout or a yell. We may be biologically predisposed to act in certain ways, but we are not "hard wired" to do so. Barash (1986) makes this point:

> Fortunately, there is some good news. Human beings, intelligent primates that we are, can exercise choice. We can overcome our primitive limitations and shortsightedness. We can learn all sorts of difficult things, once we become convinced that they are important, or unavoidable. We can even learn to do things that go against our nature. A primate that can be toilet trained could possibly even be planet trained someday. (p. 254)

Evolutionary Psychology

We have been using the terms *sociobiology* and *evolutionary psychology* interchangeably, but not everyone agrees that they are the same. Wilson says, "Evolutionary psychology is best regarded as identical to *human* sociobiology" (1998, p. 150). Additionally, David Buss, a prominent evolutionary psychologist notes that, according to the sociobiologists, the primary goal in life is to perpetuate copies of our genes into the next generation (see Chapter 10). Those activities of our ancestors that were conducive to that goal were selected and eventually became part of human nature. Buss refers to the contention that we live merely to pass copies of our genes into the next generation, the *sociobiological fallacy* (1995). According to Buss, behaviors were selected in our evolutionary past because they solved problems, not because they perpetuated genes.

> Humans are collections of mechanisms, each one was forged over evolutionary time by the process of selection. The products of this process tend to be problem specific—keep warm, avoid predators, get food, find a mate, have sex, socialize children, help kin in need, and so on. The product of the evolutionary process is not, and cannot be, the goal of maximal gene propagation. (Buss, 1999, p. 22)

Workman and Reader (2004) then define evolutionary psychology as follows:

> Evolutionary psychology is a relatively new discipline that applies the principles of Darwinian natural selection to the study of the human mind. A central claim is that the brain (and therefore the mind) evolved to solve problems encountered by our hunter-gatherer ancestors during the upper Pleistocene period over 10,000 years ago, a time know as the Environment of Evolutionary Adaptation (EEA). The mind, therefore, is seen as equipped with species-specific "instincts" that enabled our ancestors to survive and reproduce and which give rise to a universal human nature. This idea is in sharp contrast to that adhered to by many other social scientists who see the mind as originally a "blank

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> slate" that is moulded into shape by a process of learning and socialization. (p. 1)

There appears to be little in this definition with which sociobiologists would disagree. In fact, Workman and Reader conclude, "There are some differences between sociobiology and what is now known as evolutionary psychology, although whether these differences are so great as to warrant a name change is up for question" (2004, p. 17). In any case, evolutionary psychology has become one of the most popular topics in contemporary psychology (see, for example, Buss, 2004; Symons, 1979; Workman & Reader, 2004).

Of course, evolutionary psychology is not without its critics. It has been criticized, for example, for accepting adaptationism. According to the adaptationists, if a bodily structure or a behavioral tendency now exists, it must have contributed to the survival of the ancestors of a species. Gould and Lewontin (1979) found three faults with adaptationism: (1) factors other than adaptation cause evolutionary change (genetic drift and genetic mutations are two examples); (2) a trait is not necessarily adaptive in a present environment because it was adaptive in the past environments; and (3) a trait may have evolved for a specific purpose in the past but may function in totally different ways in the present. Buss, Haselton, Shackelford, Bleske, and Wakefield (1998) and Gould (1991) elaborate the last point made by Gould and Lewontin. That is, the way a characteristic is presently used by a species does not necessarily mean it evolved for that purpose. For example, a bird's feathers evolved as a mechanism for regulating body temperature and were later co-opted for flying. Therefore, to say feathers evolved because they allowed birds to fly is incorrect.

The co-option of an original adaptation for a useful but unrelated function is called an *exaptation*. Also, an original adaptation may have several unforeseen side effects. For example, the increased capacity of the human brain provided our ancestors with many adaptive benefits such as improved problem-solving skills, superior tool making, and increased memory for the location of food, water, and predators. However, the side effects of a larger brain may have included the development of language, music, and a variety of complex societal rules and regulations. Unforeseen side effects of original adaptations are called *spandrels*. To view spandrels as adaptations that increased the fitness of our ancestors is incorrect.

It should be noted that because sociobiology explains human social behavior in terms of innate influences, it was met with the same opposition as was seen in the Burt scandal and in the publication of *The Bell Curve* in 1994 (recall Chapter 10). In his autobiography, Wilson (1995) describes a number of negative reactions to the publication of his book *Sociobiology: A New Synthesis* (1975). Clearly, many of these reactions were motivated more by political or moral than by scientific concerns. For additional reading on evolutionary psychology and behavioral genetics, see Buss (1988, 1999, 2004); Geary (2005); Plomin (1990); or Plomin, DeFries, Craig, and McGuffin (2003).

The Misbehavior of Organisms

Another blow to the behaviorist's antinativistic position came from the work of Keller and Marian Breland, two of Skinner's former associates we mentioned in Chapter 13. The Brelands started a business called Animal Behavior Enterprises, which involved using operant principles to teach a variety of animals to do a diversity of tricks. The trained animals were then put on display at fairs, conventions, amusement parks, and on television. At first, the Brelands found their animals to be highly conditionable, but as time passed, instinctive behavior began to interfere with or replace learned behavior. For example, pigs that had learned to place large wooden coins into a "piggy bank" began to perform more slowly, and eventually they would root the coin instead of placing it in the bank, even when doing so delayed or prevented reinforcement. The interference with or displacement of learned behavior by instinctive behavior was called **instinctual drift**. The Brelands summarized their findings: "It seems obvious that these animals are trapped by strong instinctive behaviors,

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and clearly we have here a demonstration of the prepotency of such behavior patterns over those which have been conditioned" (1961, p. 684).

The Brelands believed that their observations contradicted three assumptions the behaviorists made: (1) An animal comes to the learning situation as a *tabula rasa*—that is, with no genetic predispositions; (2) differences among various species of animals are unimportant; and (3) any response an animal can make can be conditioned to any stimulus the animal can detect. All these behavioristic assumptions either deny or minimize the importance of instinctive behavior. Although beginning their careers as Skinnerian behaviorists, the Brelands (1961) reached the following conclusion:

> After 14 years of continuous conditioning and observation of thousands of animals, it is our reluctant conclusion that the behavior of any species cannot be adequately understood, predicted, or controlled without knowledge of its instinctive patterns, evolutionary history, and ecological niche. (p. 684)

Since the Brelands' article on the misbehavior of organisms, many other researchers have found support for their conclusions. For example, Seligman (1970) has found that within any given species of animal, some associations are easier to establish than others and that one species may be able to form associations with ease, whereas for another species this may be extremely difficult or impossible. According to Seligman, the reason for this discrepancy is that within a species, animals are biologically (genetically) prepared to form certain associations and contraprepared to form others, and the same thing is true among various species. Where an association falls on the **preparedness continuum** determines how easily an animal will learn it. Many examples of how an organism's genetic makeup influences what and how easily it can learn can be found in Hergenhahn and Olson (2005) and in Seligman and Hager (1972).

Of course, in addition to calling attention to the innate aspects of behavior, the Brelands work at Animal Behavior Enterprises did much to showcase operant conditioning procedures (Bailey & Gillaspy, 2005). And in sum, most psychologists now appreciate the contributions of both physiology and conditioning upon behavior. What varies among contemporary researchers is the relative importance they assign to these contributions.

Genetic Influences on Intelligence and Personality

Behavioral genetics is a branch of psychobiology that studies the genetic influence on cognition and behavior. Within the ancient nativism-empiricism controversy, behavioral geneticists tend toward nativism because they believe that at least some thought processes or behavior patterns are strongly influenced by heredity.

At least partially because of the work of the ethologists, Wilson, the Brelands, and Seligman, nativistic explanations of behavior are again respectable in contemporary psychology, as is exemplified by the current popularity of evolutionary psychology. As one more example, we will briefly review the work of **Thomas Bouchard** (1937–) and his colleagues. As we saw in Chapter 10, it was Francis Galton who defined the nature–nurture problem and was the first to use twins in studying that problem. Galton (1875) reached the following conclusions about the relative contributions of nature and nurture from his study of twins:

> There is no escape from the conclusion that nature prevails enormously over nurture when the differences of nurture do not exceed what is commonly found among persons of the same rank of society and in the same country. My only fear is that my evidence seems to prove too much and may be discredited on that account, as it seems contrary to all experience that nurture should go for so little. (p. 576)

Recent research by Bouchard and others suggests that Galton was correct on both accounts: nurture counts very little when compared to nature, and people will find that fact difficult to believe. Bouchard studied the influence of genetics

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Courtesy of Thomas Bouchard

Thomas Bouchard

on physical characteristics, intelligence, and personality characteristics using four primary comparison groups:

- Dizygotic, or fraternal, twins reared together (DZT)
- Dizygotic, or fraternal, twins reared apart (DZA)
- Monozygotic, or identical, twins reared together (MZT)
- Monozygotic, or identical, twins reared apart (MZA)

Dizygotic twins are genetically the same as brothers and sisters who are not twins, and monozygotic twins have all their genes in common. If experience (nurture) determines intelligence and personality, then both DZTs and MZTs would tend to correlate highly on these traits, but not DZAs and MZAs. If intelligence and personality are largely determined by genetics (nature), then DZTs and DZAs should show modest correlations on these traits, and MZTs and MZAs should show high correlations on these traits. Because all monozygotic twins in Bouchard's study were separated at birth, any similarities between them must be due to genetic influences.

Bouchard (1984) first confirmed the long-known fact that monozygotic twins are almost identical on a wide variety of physical characteristics, such as fingerprints and height. Bouchard then turned his attention to the matter of intelligence and concluded, "There is compelling evidence that the heritability of IQ is well above zero and probably between .50 and .80" (1984, p. 170). **Heritability** indicates the extent to which variation on a trait or attribute is attributable to genetics. In one study, Bouchard (1984) reported correlations between IQ scores for DZTs of .14, for MZTs of .78, and MZAs of .71, yielding a heritability measure for intelligence of about .70; that is, genetics contributes about 70% to IQ scores. It should be noted that, although heritability is typically a complex measure derived from correlation coefficients, in the case of MZA twins, correlations are a direct estimate of heritability. This is because MZA twins are genetically identical but share essentially no environmental influences. Thus, the correlation of .71 on measures of intelligence for MZA twins indicates that the heritability of intelligence is about 70%.

Next, Bouchard turned to personality characteristics, about which he said, "The domain of personality is the one in which most psychologists believe that common family environmental factors and social learning are of great importance in the determination of individual differences" (1984, p. 170). It was here that Bouchard obtained perhaps his most surprising result: Shared family environment has practically no impact on personality. That is, people have similar personality traits to the extent that they are genetically related, not to the extent that they have shared experiences. It was found that parents show practically no similarity to their adoptive children, nor do adoptive children show similarity to siblings with whom they are not biologically related. Parents show some similarity to their biological children, as do biologically related siblings. Dizygotic twins show about the same degree of similarity as biological siblings, and monozygotic twins show the greatest amount of similarity, whether they are reared together or apart. Bouchard asked, "Can it be true that common family environment has at best only a minor effect on personality?" (1984, p. 172) and his answer was yes. Bouchard went on to say, "The

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correlations [of personality characteristics] between genetically unrelated individuals reflect only environmental influences and suggest a common family environmental effect of about 5 percent" (1984, p. 173).

Tellegen et al. (1988) used the Multidimensional Personality Questionnaire to measure the heritability of 11 personality traits, such as well-being, social potency, achievement, aggression, and traditionalism. They found that the heritability of the personality traits studied was between .50 and .60, making genetics the greatest single contributor to those traits. Perhaps even more surprising is that the researchers found that religious interests, attitudes, and values are also strongly influenced by genetics. Waller, Kojetin, Bouchard, Lykken, and Tellegen (1990) found the heritability of religiosity to be about the same as for personality traits (about .50). Again, as with personality traits, shared family experience had little impact on religious interests, attitudes, and values. Waller and his coauthors concluded, "Social scientists will have to discard the a priori assumption that individual differences in religious and other social attitudes are solely influenced by environmental factors" (1990, p. 141).

One should not conclude that environmental influences on personality are unimportant. Most genetic studies of personality suggest that genetic factors account for about 50% of the variance on personality inventories, and the other 50% is accounted for by environmental factors, such as shared family experiences (about 5%), and idiosyncratic (nonshared) environmental experiences, such as accidental occurrences and experiences with peer groups (about 45%). Thus, according to the research cited here, genetics is a major contributor to intelligence and personality, but it is not the only contributor.

We saw in Chapter 10 that studies showing intelligence to be highly heritable have been and are very controversial. Studies like Bouchard's, which show that personality traits are highly heritable, are equally controversial, if not more so. The use of identical twins reared apart from birth, however, is a powerful method for studying the relative contributions of nature and nurture, and it is currently receiving considerable attention. And so, we see that despite the attempt of radical behaviorism to solve the nature–nurture debate in favor of nurture, the ancient controversy is still alive and well in contemporary psychology. For those interested in additional details about the nature–nurture issue in modern psychology, see the work of Sandra Scarr (Scarr, 1985, 1994; Scarr & Weinberg, 1978).

Biopsychology came a long way in the 20th century: From the ablation studies of Franz that influenced Lashley's search for the engram to the modern marvels of brain imaging now used extensively in cognitive neuroscience. Perhaps what stands out most is how much we still have to learn. Although much of this work is technical in nature, for those fascinated by the relationship between mind and brain we also highly recommend such approachable best-sellers as Oliver Sacks' (1985) *The Man Who Mistook his Wife for a Hat* or V. S. Ramachandran's (2010) *The Tell-Tale Brain: A Neuroscientist's Quest for What Makes Us Human*.

SUMMARY

Psychobiology explores the biological bases of psychological phenomena, and such exploration goes back at least to Hippocrates. Karl Lashley was a modern pioneer in psychobiology. Lashley was an early supporter of Watsonian behaviorism but was unable to find neurophysiological support for Watson's (and Pavlov's) switchboard conception of the brain. Instead, he found that memory for a complex learning task (like maze learning) is distributed throughout the entire cortex. If brain tissue is destroyed following such learning, disruption of performance is related more to the amount of tissue destroyed than to its location. Lashley called this observation mass action. Lashley also found that within a functional area of the brain, any of the tissues within that area are capable of performing its function. Lashley called this equipotentiality. Lashley sought the neurophysiological locus of memory and learning in vain, as have subsequent researchers. Lashley's conclusions about brain functioning were more in accordance with Gestalt theory.

One of the many illustrious psychologists influenced by Lashley was Donald Hebb. Hebb was willing to speculate about psychobiology even when radical behaviorism was most influential. According to Hebb, neurons in the brain that are consistently active together or in close succession become a cell assembly. Cell assemblies that are consistently active together or in close succession become phase sequences. In this way, consistently occurring environmental events gain neurological representation. Thereafter, when a cell assembly or phase sequence is stimulated, individuals have thoughts, or streams of thoughts, of the environmental objects or events that caused their development. Hebb's other innovative research topics included fear, enriched environments, sensory deprivation, and arousal theory.

Another illustrious psychologist influenced by Lashley was Roger Sperry. Sperry and his colleagues created split brains in animals by ablating their corpus callosums and optic chiasms. With such a preparation, the two hemispheres of the brain learn independently. It was discovered that splitting the brains of humans suffering from severe epilepsy often dramatically improved their condition. Humans with split brains made it possible to study the function of the left and right hemispheres of the cortex in ways never before possible. Sperry and his colleagues discovered considerable hemispheric specificity concerning a number of cognitive and emotional phenomena. The study of hemispheric specificity remains popular within contemporary psychobiology.

Even during behaviorism's heyday, a group of ethologists were explaining a variety of species-specific behaviors in terms of evolutionary theory. The success of this research program contributed to the decline in the popularity of behaviorism. The sociobiologists extended ethology to the study of complex social behavior. Humans inherit a biogrammar that predisposes them to engage in a wide variety of cultural activities. However, culture is created because it enhances survival, and if it does not do so, the culture will deteriorate and perhaps become extinct. Thus, biology is said to hold culture on a leash. Although humans inherit behavioral dispositions, behavior must always be explained in terms of both biology and culture. Biological tendencies can be, and often are, inhibited by cultural influences.

Evolutionary psychologists are a variation of sociobiologists focused on human behavior. Based on explanatory success in areas such as mate selection, evolutionary psychology continues to rise in popularity. The works of Marian and Keller Breland showed that learned behavior often drifts toward instinctive behavior, and this instinctual drift violates several assumptions made by the radical behaviorists. Similarly, Seligman has found that where an association falls on the genetically determined preparedness continuum determines the ease with which it will be learned. Finally, Thomas Bouchard and his colleagues, using twin studies that included identical twins reared apart, have demonstrated a strong genetic influence on both intelligence and personality traits.

DISCUSSION QUESTIONS

1. Provide evidence that psychobiology has been a persistent theme throughout psychology's history.
2. Discuss Lashley's principles of mass action and equipotentiality. In what way(s) did these principles conflict with the behavioristic view of brain functioning? How did they support the Gestalt view of brain functioning?
3. What is the engram? Was Lashley's search for it successful? Was that of subsequent researchers?

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4. According to Hebb, what are cell assemblies and phase sequences, and how do they develop? Give an example of how Hebb employed the concepts of cell assembly and phase sequence in explaining cognitive experience.
5. Describe Sperry's split-brain preparation. What discoveries about the learning process did Sperry make using this preparation? Why was the preparation used on humans? What was learned about hemispheric specificity by studying humans with split brains?
6. Explain how the ethologists were instrumental in reducing the influence of radical behaviorism.
7. What were Tinbergen's four aims? What is the ethological attitude?
8. Within sociobiology, what is the meaning of the term *biogrammar*? *Nothing-butism*? What is the leash principle?
9. Why have evolutionary psychologists been criticized for emphasizing adaptationism?
10. In what ways did the Brelands' observation of instinctual drift contradict assumptions made by the behaviorists? How did Seligman's preparedness continuum also contradict those assumptions?
11. What was Bouchard's rationale for using identical twins reared apart from birth in his study of the relative contributions of nature and nurture to intelligence and personality? What conclusions were supported by his research?
12. What is the status of the nature–nurture debate in psychology today?

SUGGESTIONS FOR FURTHER READING

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GLOSSARY

Behavioral genetics A branch of psychobiology that studies the genetic influence on cognition or behavior.

Biogrammar According to the sociobiologists, the inherited structure that predisposes organisms toward certain kinds of social activities.

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Bouchard, Thomas (b. 1937) Headed a research program that featured the study of identical and fraternal twins reared together and apart. Results indicated that intelligence and several personality traits are highly heritable.

Cell assembly According to Hebb, a system of interrelated neurons that reflects recurring environmental events. When stimulated, cell assemblies cause ideas of those events.

Engram The supposed neurophysiological locus of memory and learning. Lashley sought the engram in vain, as have subsequent researchers.

Equipotentiality Lashley's observation that within a functional area of the brain, any tissue within that area can perform its associated function. Therefore, to destroy a function, all the tissue within a functional area must be destroyed.

Ethology The study of species-specific behavior in an animal's natural habitat. The ethologist typically attempts to explain such behavior in terms of evolutionary theory. (*See also* **Species-specific behavior**.)

Hebb, Donald Olding (1904–1985) Under the influence of Lashley, did pioneering research in psychobiology. (*See also* **Cell assembly** and **Phase sequence**.)

Heritability A measure of how much of the variation in a trait or attribute is determined by genetics.

Instinctual drift The tendency for learned behavior to be interfered with or displaced by instinctive behavior.

Lashley, Karl Spencer (1890–1958) An early supporter of Watsonian behaviorism who eventually left the behavioristic camp when his neurological research failed to support the switchboard conception of the brain upon which behaviorism was based. (*See* also **Equipotentiality** and **Mass action**.)

Leash principle Wilson's contention that humans create culture because doing so enhances survival. Therefore, there is, or should be, a close relationship between culture and the satisfaction of biological needs. In this sense, it can be said that biology holds culture on a leash.

Lorenz, Konrad (1903–1989) A Nobel Prize winning ethologist. He is best known for his work on imprinting in geese and on human aggression.

Mass action Lashley's observation that if cortical tissue is destroyed following the learning of a complex task, deterioration of performance on the task is determined more by the amount of tissue destroyed than by its location.

Phase sequences According to Hebb, systems of interrelated cell assemblies that form because of the simultaneous or sequential activation of cell assemblies. When a phase sequence is activated, it causes a stream of interrelated ideas.

Preparedness continuum Seligman's observation that degree of biological preparedness determines how easily an association can be learned.

Psychobiology The attempt to explain psychological phenomena in terms of their biological foundations.

Sociobiology The discipline founded by Edward Wilson that attempts to explain complex social behavior in terms of evolutionary theory. (Also called evolutionary psychology.)

Species-specific behavior Behavior that is typically engaged in by all members of a species under certain environmental circumstances. Very close to what others call instinctive behavior.

Sperry, Roger W. (1913–1994) The psychobiologist who used the split-brain preparation to study hemispheric specificity in humans and nonhuman animals. Using this technique, Sperry and his colleagues discovered that a number of cognitive and emotional phenomena are specific to either the right or left hemispheres of the cortex. (*See also* **Split-brain preparation**.)

Split-brain preparation A brain that has had its corpus callosum and optic chiasm ablated.

Tinbergen, Niko (1907–1988) A Nobel Prize winning ethologist. Among psychologists, he is best known for his outline of the aims of ethology—to understand the function, ontogeny, causation, and evolution of behavior.

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19

Cognitive Psychology

Cognitive psychology includes such topics as memory, concept formation, attention, reasoning, problem solving, mental imagery, judgment, and language. As you likely have seen in your other classes, such topics are central to contemporary psychology. From the Ancient Greeks to the empirical and rational philosophers, many have sought to explain human cognition. Clearly, the schools of voluntarism and structuralism concentrated on the experimental study of cognition, and the school of functionalism studied both cognition and behavior. It was the supposed sterility of the research on cognition performed by members of these schools that prompted Watson to create the school of behaviorism. Thus, to say, as is common, that psychology is *becoming* more cognitively oriented is inaccurate because with only a few exceptions psychology has always been cognitively oriented.

But, there was a period from before 1930 to after 1950 when radical behaviorism was highly influential and it was widely believed that cognitive events were simply by-products (epiphenomena) of brain activity and could be ignored. As long as such beliefs were dominant, the study of cognitive processes was inhibited. As we will see in the first part of this chapter, such beliefs eventually dissipated because of the convergence of several streams—from advances in physiology, from Gestalt and social psychology, from interest in development, even from linguistics and the rise of computing machinery.

EARLY INFLUENCES

It was J. S. Mill (1843/1988) and his mental chemistry that set the stage for cognitive psychology as an experimental science of mind, and who encouraged the development of such a science. Fechner (1860/1966) took Mill's lead and showed that cognitive events could be studied *experimentally*. Ebbinghaus (1885/1964), under the influence of Fechner, studied learning and memory experimentally, discovering foundational facts that remain canonical today. In turn, the Würzburg school conducted research on a wider array of cognitive topics. William James's book *The Principles of Psychology* (1890/1950) summarized this already considerable research on cognition and suggested many additional possibilities. Brook's (2007) *The Prehistory of Cognitive Science* details these contributions through James.

Cambridge psychologist **Sir Frederic Charles Bartlett (1886–1969)**, in his book *Remembering: A Study in Experimental and Social Psychology* (1932), demonstrated how memory is influenced more by personal, cognitive themes or schema than by the mechanical laws of association. Although the book reports several clever studies illustrating the limits and reconstructive nature of memory, the most famous was his use of the short Kwakiutl Indian tale, the "War of the Ghosts." Chosen as a novel stimulus, subjects read the material twice, and then at different times were asked to reproduce the brief story. Bartlett found consistent patterns in how memory degraded over time, but also in how details became unconsciously reconstructed to preserve the overall meaning and coherence.

For example, where the original read, "When the sun rose he fell down. Something black came out of his mouth" became "his soul fled black from his mouth," or "his soul passed out of his mouth,"

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Sir Frederic Charles Bartlett

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and even "his spirit left the world." As verbatim memory faded, participants retained the gist of the story. Recalling only some specific elements of the original—such as the death of a character—his British subjects unconsciously reconstructed those elements within their own Christian language and conception of death.

In other words, he found that information is always encoded, stored, and recalled in terms of an individual's preconceptions and attitudes (recall Bacon, 4). Indeed, Ulric Neisser (who we will consider later) would extend this work in a fascinating study of the memory of Watergate notable John Dean. Neisser (1981) would show that the mistakes Dean made as he naturally reconstructed events were all sensibly related to his personality and experiences. That memory is far from perfect, as well as being schematic and reconstructive in nature, is fully accepted today (see, for example, Schacter, 2001), and implications—such as for eyewitness testimony—represent a major contribution of cognitive psychology (Loftus & Palmer, 1974).

As cognitive psychology developed, it was common to acknowledge a debt to Bartlett's work (Johnston, 2001), including his popularization of schema. Actually, Bartlett borrowed the term from a contemporary, the noted physiologist Sir Henry Head. Another person associated with popularizing schema, this time in the context of cognitive development, was **Jean Piaget (1896–1980)**.

Jean Piaget

Piaget was born in Neuchatel, Switzerland, the son of an academic father. He published his first scientific paper at age 10, and by 19 had authored over 20 scholarly publications (mostly on molluscs). He was even offered an academic appointment at a natural history museum, which he had to turn down since he had not yet finished high school. In addition to biology, Piaget read extensively in the philosophy of psychology, especially the works of Nobel Prize winner Henri Bergson (1849–1941), as well as Herbert Spencer and William James. In his autobiography he would write "Between biology and the analysis of knowledge … I discovered a need that could be satisfied only by psychology" (1952, p. 240).

Bill Anderson/Photo Researchers/Getty Images

Jean Piaget

Piaget earned his PhD (in biology) at 22, soon afterward beginning his transition toward psychology. He worked briefly with Bleuler and Jung (both Chapter 16), then on intelligence testing with Theodore Simon (Chapter 10). Eventually resonating with the thoughts of James Mark Baldwin (Chapter 11) and the Gestaltists, by 1926 Piaget had begun his now famous research on intellectual development. During his long life, Piaget wrote more than 50 books and monographs on genetic epistemology, or the biological basis of knowledge. For a discussion of how Piaget's methods for studying the cognitive abilities of children developed over time, see Mayer (2005).

In general, Piaget demonstrated that a child's interactions with the environment become more complex and adaptive as its cognitive structure becomes more articulated through maturation and experience. According to Piaget, the cognitive structure comprises schemata that determine the quality of one's interactions with the environment. For the young child, these schemata are sensory motor reflexes that allow only the most rudimentary interactions with the environment. With maturation and experience, however, the schemata become more sophisticated and allow increasingly complex (intelligent) interactions with the environment.

Piaget outlined a series of stages that captured this human ontogeny. From birth to about age 2, the child is in the *sensorimotor stage* where the infant develops associations between sensations and actions. From about 2 to around 7, the child is in the *preoperational stage*. This stage is when the child begins to understand how the world works and is organized, as well as how to operate (with language and behavior) within such constraints. From around 7 until about 11 or 12, the child is in the *concrete operations stage*. Problem-solving skills related to tangible objects further develops during this period, but it is not until the final stage—the *formal operations stage*—that problem-solving skills involving abstract ideas (and ideals) takes hold.

For Piaget it is always the schemata contained within the cognitive structure that determine what kinds of interactions with the environment are possible. Piaget's theory followed the rationalistic rather than the empiricistic tradition. More particularly, because it stressed the importance of schemata for determining a person's reality, it followed the Kantian tradition. Piaget wrote books about the child's conceptions of causality, reality, time, morality, and space, all showing the influence of Kant's proposed categories of thought. Many of these works were done in collaboration with Barbel Inhelder (1913–1997), who also worked to popularize Piaget among an American audience. Early adherents included Jerome Bruner (considered later) and also Lawrence Kohlberg (1927–1987), who extended Piaget's ideas in the area of moral development.

It is interesting to note that Piaget was an even more prolific writer than Wundt was. In Chapter 9 we noted that Wundt published 53,735 pages in his lifetime, or 2.2 pages a day (Boring, 1950); Zusne and Blakely (1985) report that Piaget published 62,935 pages in his lifetime, or 2.46 pages a day. In Chapter 13 we noted that when 1,725 members of the American Psychological Society were asked to rank the most eminent psychologists of the 20th century, Skinner was ranked first, Piaget second, and Freud third (Dittman, 2002).

Cybernetics

In 1948 Norbert Wiener (1894–1964) defined *cybernetics* as the study of the structure and function of information processing systems. Of particular interest to Wiener was how mechanical or biological systems can achieve a goal or maintain a balance by automatically utilizing feedback from their activities. The automatic pilots on airplanes and household thermostats are examples of such systems. Soon it was realized that purposive human behavior could also be explained in such mechanistic terms, thus overcoming the argument that the study of purposive (goal-directed) behavior must necessarily be subjective.

In what would come to be considered a "landmark event in the history of cybernetics, and fundamental to the development of cognitive science" (Abraham, 2002, p. 3), the neurologist Warren McCulloch and logician Walter Pitts showed that the communications between nerves could be modeled using formal logic (McCulloch & Pitts, 1943). Inspired by Leibnitz' Stepped Reckoner (Chapter 6), this would become the starting point for the development of computer based neural networks (discussed later), and much of contemporary artificial intelligence. Pitts was a prodigy in mathematics with minimal traditional education, who had begun a correspondence with the famed philosopher and mathematician Bertrand Russell at age 12 after reading and identifying issues with the Nobel Prize winner's masterwork, *Principia Mathematica*. In 1959, Pitts would also be a coauthor on one of the foundational works in cognitive neuroscience, "What the Frog's Eye Tells the Frog's Brain."

In 1949 Claude Shannon, working for the Bell Telephone Laboratories, and Warren Weaver, working for the Rockefeller Foundation, were seeking ways of improving the purity of messages between the time they are sent to the time they are received. The work of Shannon and Weaver began what came to be called *information theory*. Information theory notes the various transformations that information undergoes as it enters a communication system, as it operates within the system, and as it leaves the system. In turn, information would become a key concept for psychology as it transitioned away from behaviorism (for example, Garner, 1962; Miller, 1951). As we will see later in this chapter, information processing psychology, like information theory, attempts to understand those structures, processes, and mechanisms that determine what happens to information from the time it is received to the time it is acted on. For a discussion of the influential role the concept of "information" has played in psychology's history, see Collins (2007).

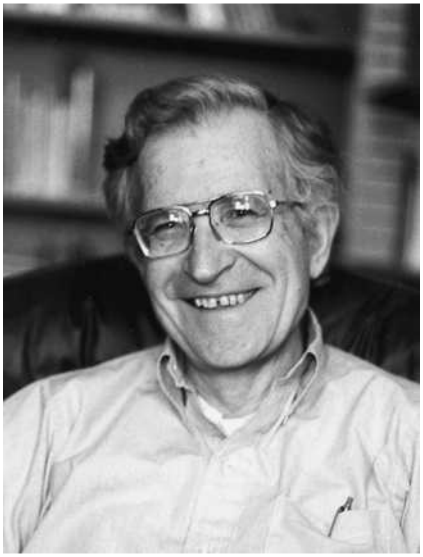
DEVELOPMENTS AROUND THE 1950s

Language and Information

Noam Chomsky (1928–) was born in Philadelphia and studied linguistics at the University of Pennsylvania. He joined the faculty of the Massachusetts Institute of Technology (MIT) in 1955, and remained there for over 50 years. It is often suggested that Chomsky's review of Skinner's 1957 book *Verbal Behavior* was the first shot of the "cognitive revolution."

In his review, Chomsky (1959) forcefully argues that language is too complex to be explained by operant principles, maintaining that the human brain is genetically programmed to generate language. Indeed, the very fact that most of the language we utter every day is novel represents a challenge to traditional learning theories that are often based on reprising past associations. Each child, says Chomsky, is born with brain structures (a language acquisition device) that make it relatively easy for the child to learn the rules of language; the deep grammar and syntactical structures that are common to all languages. In his compelling "poverty of stimulus" argument, Chomsky argues that children cannot learn these rules if they have to rely solely on principles of association (such as frequency or contiguity), and on Skinnerian reinforcement. This successful nativistic attack on empirically based behaviorism certainly did much to weaken its influence.

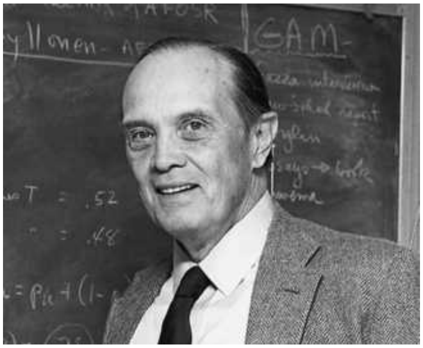
Following Kuhn's model of scientific paradigms and revolutions, much has been made of Chomsky's being a linguist. That is, being an expert on language but from outside of psychology made him an ideal revolutionary as he was not tied to the existing paradigm. In fact, work on language that would now be seen as central to psychology was then done mostly by philosophers and linguists such as Charles Kay Ogden and I. A. Richards (see Ogden & Richards, 1923). Some of Chomsky's ideas about language built upon the work of Wilhelm von Humbolt (1767–1835), and were not altogether revolutionary in linguistics. Nevertheless, Chomsky did radically change the course of psychology. Other work on language soon followed, including research by such notable psychologists as Roger Brown (1925–1997) and James Deese (1921–1999).



MIT News Office

Noam Chomsky

George Armitage Miller (1920–) was born and initially educated in Alabama before completing his PhD at Harvard with the noted psychophysicist S. S. Stevens (Chapter 13). Miller remembers that during the 1950s, " 'cognition' was a dirty word because cognitive psychologists were seen as fuzzy, hand-waving, imprecise people who really never did anything that was testable" (p. 254). In 1955 Miller traveled to Cambridge for a conference on cognition arranged by Bartlett, his successor, Donald Broadbent (1926–1993), and the American Jerome Bruner (covered below). As we will see



Courtesy of George A. Miller

George A. Miller

later in the chapter, early cognitive psychology eventually adopted the information processing metaphor and both Miller and Broadbent (1957, 1958) would become the leaders of the field. In fact, according to Baars (1986), "There is little doubt that George A. Miller … has been the single most effective leader in the emergence of cognitive psychology" (p. 198). Crowther-Heyck (1999) also discusses the importance of Miller's work in the development of cognitive psychology, and we will continue to note some of his major contributions throughout this chapter.

Miller himself holds that modern cognitive psychology began during another symposium on information theory sponsored by the Massachusetts Institute of Technology on September 10–12, 1956. Participants in the MIT symposium certainly did much to bring the terminology and concepts of information theory and cybernetics into psychology. During the symposium, Allen Newell (1927–1992) and the eventual Nobel Prize winner Herbert Simon (1916–2001) presented papers on computer logic; Noam Chomsky presented his views on language as an inherited, rule-governed system; and Miller described his research demonstrating that people can discriminate only seven different aspects of something—for example, hues of color or pitches of sound. Also, people can only retain about seven meaningful units of experience (chunks) such as numbers, words, or short sentences. Miller summarized his research in his influential paper, "The Magical Number Seven, Plus or Minus Two: Some Limits on our Capacity for Processing Information" (1956). Although both Ebbinghaus and Cattell had made similar points, the timing was right for Miller's article to become a classic, as well as to launch the cognitive consideration of memory.

Jerome Bruner (1915–) began his studies in psychology with McDougall (Chapter 12) at Duke, then completed his PhD at Harvard with Gordon Allport (below). Later he worked with social psychologists Rensis Likert and Hadley Cantril (Chapter 4). Interested in educational applications of psychology, Bruner was an early proponent of Piaget. Likewise, Bruner (1986) recalls first hearing about Lev Vygotsky's similar work (Chapter 12) in 1954. Vygotsky's research included topics such as the relationship between language and thought, as well social and cognitive development. It was largely through Bruner's efforts that Vygotsky gained popularity in the United States. By the early 1950s, Bruner's own interest had shifted to thinking and concept formation, and as previously noted in 1955, he assisted Sir Frederic Bartlett in arranging, at Cambridge, one of the first conferences on cognitive psychology (Bruner, 1980).

In 1956 Bruner (along with Jacqueline Goodnow and George Austin) published *A Study of Thinking*, which emphasized concept learning. Although concept learning had been studied earlier by Hull and Thorndike, their explanations of such learning were couched in terms of passive, associationistic principles. The explanation offered by Bruner and his colleagues stressed the active utilization of cognitive strategies in such learning.

Physiological and Gestalt Influences

As we have seen, Gestalt psychology and radical behaviorism were created about the same time (1912 and 1913, respectively), and the cognitively oriented Gestaltists were a constant counterpoint to the behaviorists. During the 1930s and 1940s, methodological behaviorists such as Hull and Tolman were willing to postulate events that intervened between stimuli (S) and responses (R). For Hull, these intervening variables were mainly physiological, but for Tolman they were mainly

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cognitive. Although quieted during the heyday of Skinner, this influence of physiology and Gestalt psychology upon behaviorism was a foreshadowing of things to come.

Concurrently with the major figures we have already reviewed (Chomsky, Miller, etc), pressure on behaviorism continued from physiological and Gestalt psychologists. As early as the 1948 conference on "Cerebral Mechanisms in Behavior" at Caltech, Karl Lashley (Chapter 18) anticipated the formation of a cognitive neuroscience (Gardner, 1985). In 1951 Lashley argued that the explanation of serial or chained behavior offered by learning theorists was insufficient. Rather, he said, such organized behavior could emanate only from within the organism.

In his book *The Organization of Behavior* (1949), Donald Hebb not only sought biological explanations of behavior but also urged the study of cognitive processes. As we saw in Chapter 18, Hebb continued to encourage the development of both physiological and cognitive psychology into the 1950s and 1960s. For example, in his influential 1955 publication, "Drives and the C.N.S. (Conceptual Nervous System)," Hebb flaunted his willingness to "physiologize" about cognitive processes and thus to engage in battle with the behaviorists.

Like Hebb, other physiological psychologists also pursued mentalistic constructs. In 1949 Harry Harlow (1905–1981) published "The Formation of Learning Sets," which provided evidence that monkeys employ mental strategies in their solving of discrimination problems. Such findings were clearly in conflict with the behavioristic psychology of the time. Later, Harlow would follow the work of the Freudian John Bowlby (Chapter 17) in his studies of attachment.

Mentioned in Chapter 14, Solomon Asch (1907–1996) and Leon Festinger (1919–1989) were American Gestaltists who did classic (and cognitive) work in social psychology. Asch's 1946 work on impression formation and person perception is often seen as the starting point for the subfield of social cognition. Asch (1956) famously was able to get more than 75% of his subjects to report erroneous responses in a simple perceptual discrimination task by providing social pressures to conform their answers to those of the majority. The work of Stanley Milgram (1933–1984) on obedience—perhaps the best known (and most misrepresented) research in the history of social psychology—was a direct extension of Asch.

Festinger's *A Theory of Cognitive Dissonance* (1957; see also Festinger & Carlsmith, 1959) noted that the ideas that one entertains may be compatible or incompatible with one another. Incompatibility exists, for example, if one is engaged in an obviously boring task but is encouraged to describe it as interesting, or if one smokes cigarettes and yet believes that smoking causes cancer. When ideas are incompatible, a state of dissonance exists that motivates a person to change beliefs or behavior. In the cases above, for example, a person could reduce cognitive dissonance by telling the truth about the task being boring or become convinced that the task is actually interesting. With the smoker, cognitive dissonance could be reduced by quitting the habit or by believing there really is little risk of cancer. Festinger's influential book made no reference to behavioristic ideas. As an aside, beyond his famous contribution concerning cognitive dissonance, Festinger (Festinger, Riecken, & Schachter, 1956) also wrote a fascinating work about his experiences with a doomsday cult.

More Social Psychology. Fritz Heider (1896–1988) studied at least briefly with all of the major Gestaltists and several of America's leading social psychologists (for example, Roger Barker, Gardner Murphy) before producing his classic in 1958, *The Psychology of Interpersonal Relations*. The book begins with a Gestalt consideration of perception, then introduces the concept of **attribution**, or how we understand and explain behavior. According to Heider, when we see an event—say a stellar athletic play, such as an interception—we make sense of the event by appeal to one of four explanations. For example, that the play was the result of great individual *effort*, that the interception demonstrated superior athletic *ability*, that the play naturally unfolded from a well-executed plan or the *task* of the athletes within the play, or perhaps that it was just *luck*. As simple as it may seem, see for yourself if your explanations of things you observe don't distill into these basic patterns.

To borrow from Ebbinghaus, social psychology has a long past but only a recent history. From Plato to the political philosophy that underpinned the empiricists, explaining social behavior has been pursued by many. Various French thinkers such as Gabriel Tarde (1843–1904), Gustave LeBon (1841–1931), and Emile Durkheim (1858–1917) are most associated with the formalization of a "social science" around the start of the 20th century. In America, James Mark Baldwin, William McDougall, and Hall's student Norman Triplett are credited as founding figures of a social psychology. Although some of the behaviorists we have noted in passing did work in social psychology (for example, Barker, Kantor), for the most part early social psychologists—like the Gestaltists—worked at the periphery.

Examples include the brothers Floyd Allport (1890–1978) and Gordon Allport (introduced in Chapter 1). Both were Harvard educated. Floyd's contributions include his work on social facilitation (1924), or how the presence of other people impacts our performance on matters as diverse as solving math problems and working a fishing reel. After Harvard, Gordon did postdoctoral studies in Europe, spending time with Wertheimer, Köhler, Bartlett and the linguist I.A. Richards. His most enduring work in social psychology was his 1954, *The Nature of Prejudice*.

Inspired by McDougall's interests, Gardner Murphy's (1895–1979) initial research at Harvard concerned parapsychology. From such beginnings he would rise to become APA President in 1944 and to be seen as the central figure in social psychology through World War II. Murphy's students included several figures you may recall from a social psychology course: Rensis Likert (of Likert scale fame), Theodore Newcomb (the liberalization of Bennington College students), and Muzafer Sherif (conflicts at Summer camp). As another example of social psychology's growing influence, Newcomb was elected APA President in 1956.

By the 1950s, even those trained as good behaviorists were starting to explore social (and cognitive) matters. Examples include Hull's students Carl Hovland (1912–1961), Charles Osgood, and Neal Miller (Chapter 13, and below). Hovland studied a variety of topics related to information and communication that would today be considered cognitive, but is best known for his work in the areas of information credibility, interpersonal persuasion, and attitude change. A leader among the psychologists involved in WW II, Hovland also extended his work on learning and cognition to business applications. As noted in Chapter 13, Osgood developed the semantic differential to understand the meaning we assign to our concepts.

Following Milgram's obedience studies in the early 1960s, in which he found that normal subjects would comply with potentially harmful instructions far, far, more often than professionals (such as psychiatrists) had predicted, social psychology had "arrived" as a major subdivision of American psychology. Equally dramatic was the work done by the 2002 APA President, Philip Zimbardo (1933–), in his infamous simulation of prison social roles. Since these works are covered extensively in every introductory and social text, we will not reprise them in detail here. Still, it is worth noting that both these works also contributed to our modern interest in protecting human subjects.

By the late 1960s, research such as John Darley and Bibb Latane's work on bystander apathy were fueling psychology's popularity among students and the general public. To come full circle, it should be noted that Darley's undergraduate mentor was the Gestaltist Solomon Asch, and his dissertation advisor was the early cognitive psychologist Jerome Bruner. Likewise, one of the first modern psychologists to focus on language, the aforementioned Roger Brown (see, *Words and Things, 1958*), would also write the first canonical textbook on social psychology in 1965.

A COGNITIVE REVOLUTION

The metaphor of a cognitive revolution is usually linked with Kuhn's (1996) work on the sociology of science. Although accurate, it is not the whole story. In 1960 Donald Hebb served as president of the APA (following Köhler, who had served in 1959), and his presidential address was on "The American Revolution." In this address, Hebb was referring not to a U.S. political revolution but to the country's psychological revolution. According to Hebb, only one phase of the American revolution in psychology had taken place. This was the behavioristic phase, and it produced precise, factual knowledge and scientific rigor that had not previously existed in psychology. However, in their effort to be entirely objective, the behaviorists had minimized or banished such topics as thought, imagery, volition, and attention. Hebb urged that the second phase of psychology's revolution use the scientific rigor promoted by the behaviorists to study cognitive processes.

Concerning the second phase of the revolution, Hebb (1960) said, "The camel already has his nose inside the tent" (p. 741). He noted the works of Festinger, Broadbent, and Miller, as good starts toward a rigorous cognitive psychology. He was especially impressed by the possibility of the computer acting as a model for studying cognitive processes. He accurately prophesized that such a model will become "a powerful contender for the center of the stage" (1960, p. 741). Of course, Hebb's preferred approach to studying cognitive processes was to speculate about their biological foundations.

To extend Hebb's metaphor a bit, we can align George Miller with George Washington. In 1960 Miller and his colleagues Eugene Galanter and Karl Pribram (Chapter 18) published *Plans and the Structure of Behavior*, in which it was argued that cybernetic concepts (such as information feedback) explain human goal-directed behavior better than S–R concepts do, and at least as objectively. This would become the first "classic" in the new information processing approach to psychology.

Also in 1960, Miller and Bruner founded the Center for Cognitive Studies at Harvard. America's most prestigious University, and the one that employed Skinner himself, now had a center for cognitive studies. In 1962 Miller published an article titled "Some Psychological Studies of Grammar" (1962a), which formally introduced Chomsky's nativistic analysis of language to psychology. In 1890 William James had defined *psychology* as "the science of mental life"; and in 1962 Miller purposefully used James's definition as the title of his introductory text *Psychology: The Science of Mental Life* (1962b).

In 1963, as evidence of how far cognitive psychology had progressed and in recognition of Miller's role in leading that progress, Miller was presented a Distinguished Scientific Contribution Award by the APA. Miller served as president of the APA in 1969 (Bruner had served in 1965), received the Gold Medal for Life Achievement in Psychological Science from the American Psychological Foundation (APF) in 1990, and was awarded a National Medal of Science by President George Bush in 1991; in 2000 the Association of Neuroscience Departments and Programs presented him with its Millennial Award. In 2003 Miller was presented the APA's Outstanding Lifetime Contribution to Psychology Award. He is currently professor emeritus in psychology at Princeton University.

Revolutions can be bloody affairs, and in addition to Chomsky's seminal review there were other direct attacks upon behaviorism as well. In 1962 and 1963, M. D. Egger and Neal Miller demonstrated that, contrary to tradition, classical conditioning phenomena cannot be explained in terms of associative principles alone. Based in part on Neal Miller's work with imitative learning, a new brand of behaviorism, one more compatible with cognitive and social psychology also emerged in the early 1960s. This was Albert Bandura's social learning theory (Bandura, Ross, & Ross, 1961, 1963a, 1963b). Born in Alberta, Canada, Albert Bandura (1925–), who served as APA President in 1974, is often considered a disciple of Spence (Chapter 13), but in several ways, Bandura's theory (for example, 1986) can best be understood as a descendent of Tolman's ideas:

> Tolman believed learning to be a constant process that does not require reinforcement, and Bandura believes the same thing. Both Tolman's theory and Bandura's theory are cognitive in nature, and neither are reinforcement theories.… Although Tolman believed that learning was constant, he believed further that the information gained through learning was only acted on when there was reason for doing so, such as when a need arose. For example, one may know full well where a

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> drinking fountain is but will act on that information only when one is thirsty. For Tolman, this distinction between learning and performance was extremely important, and it is also important in Bandura's theory. (Hergenhahn & Olson, 2005, p. 341)

Kuhn (1996) notes that for a revolution to be complete, that the control of research programs as exhibited by journals and granting agencies, as well as the training of new students via histories and textbooks, must all pass to the new paradigm. By the late 1960s, cognitive psychology was mature enough to have its own courses and textbooks. The first such work to be widely adopted was Neisser's 1967 *Cognitive Psychology*. **Ulric Neisser (1928–2012)** was born in Germany, but came to the United States in 1933. He was influenced by Gestalt and Gibsonian (Chapter 6) perceptual theories, as well George Miller while earning his PhD at Harvard.

In his book, Neisser defined the term *cognition* as "all the processes by which … sensory input is transformed, reduced, elaborated, stored, recovered and used" (p. 4). Also in this book, Neisser attempted to integrate research on such topics as perception, concept formation, meaning, language, and thinking, using a few concepts adopted primarily from information theory. According to Roediger (2000), many of the ideas put forth in Neisser's *Cognitive Psychology* were derived from Bartlett's earlier work, and Neisser acknowledged this debt to him.

By 1976 Neisser had come to doubt the continued utility of the information processing approach, and to address the situation he produced a second generation text, *Cognition and Reality*. Moving away from the information processing metaphor, *Cognition and Reality* instead focused on schema and the perceptual cycle by which schema make sense of incoming information and in turn guide behavior. The book also lays out a guide for future cognitive research, noting the importance of practical applications and a more *ecological psychology*. Ecological psychology moves away from the narrow confines of laboratory experimentation and toward a study of cognition as it occurs naturally in real-life situations. Neisser understood that behaviorism had succeeded in many practical applications, and that cognitive psychology must do the same.

Neisser (1982) provides a collection of ecologically relevant studies on memory. Included are such topics as flashbulb memories (vivid memories of such important events as the assassination of John F. Kennedy), mnemonics (strategies that enhance effective memory retrieval), memorists (people with exceptional memory), and the accuracy of eyewitness testimony. For the details of his life and career in psychology, see Neisser (2007).

Once the grip of behaviorism—especially radical behaviorism—had been loosened, many earlier efforts in experimental cognitive psychology were reevaluated. For example, about the influence of Ebbinghaus, Michael Wertheimer (1987) says, "His seminal experiments can … be viewed as the start of what was to become the currently popular field of cognitive psychology" (p. 78). Concerning the influence of early Gestalt psychology, Hearst (1979) said, "Present-day cognitive psychology—with its emphasis on organization, structure, relationships, the active role of the subject, and the important part played by perception in learning and memory—reflects the influence of its Gestalt antecedents" (p. 32). In an interview, Neisser describes how Gestalt psychology influenced him:

> I … became particularly interested in Gestalt psychology. It had an idealistic quality that appealed to me. To the Gestalt psychologists human nature was something wonderful, worth exploring, worth knowing about. They were constantly doing battle with the behaviorists, who seemed to see human nature as a mere collection of conditioned responses or blind associations. From the Gestalt viewpoint, the mind is something beautiful, well-structured, in harmony with the universe. (Baars, 1986, p. 274)

In addition to texts, the journal *Cognitive Psychology* was founded in 1969, and within the next two decades, more than 15 additional cognitive journals were established, featuring articles on such topics as attention, problem solving, memory, perception, language, and concept formation. Building off the early contributions of Atkinson and Shiffrin (1968) and Tulving (1972), memory research would become especially popular. Telling, the prestigious *Journal of Verbal Learning and*

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Verbal Behavior changed its name to the *Journal of Memory and Language*.

Interest in experimental cognitive psychology had become so extensive that many truly believed a revolution, or paradigm shift, had occurred in psychology (for example, Baars, 1986; Gardner, 1985; Sperry, 1993). Others, however, suggest that contemporary cognitive psychology represents a *return* to the kind of psychology that existed before the domination of behaviorism (for example, Robins, Gosling, & Craik, 1999). If anything, then, there occurred a counterrevolution, rather than a revolution (see Hergenhahn, 1994). Even George Miller, who, as we have seen, was as responsible as anyone for this change in psychology, rejects the idea that a revolution took place:

> What seems to have happened is that many experimental psychologists who were studying human learning, perception, or thinking began to call themselves cognitive psychologists without changing in any obvious way what they had always been thinking and doing—as if they suddenly discovered they had been speaking cognitive psychology all their lives. So our victory may have been more modest than the written record would have led you to believe. (Bruner, 1983, p. 126)

In either case, in the early 1970s, information processing emerged as the dominant form of psychology. Information processing took the computer program as a model for the workings of the mind. As such, before further discussing the evolution of information processing psychology, we will first need to consider some philosophical questions raised by the field of artificial intelligence.

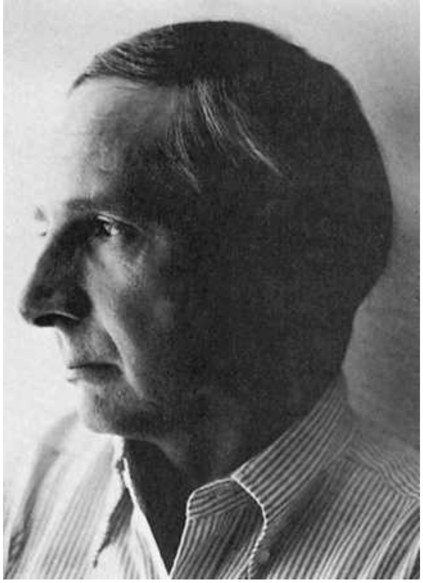
ARTIFICIAL INTELLIGENCE

Developments in cybernetics, information theory, and computer technology combined to form the field of artificial intelligence. Fetzer (1991) defines **artificial intelligence (AI)** as a "special branch of computer science that investigates the extent to which the mental powers of human beings can be captured by means of machines" (p. xvi). In 1950 the brilliant English mathematician **Alan Turing (1912–1954)** founded the field of artificial intelligence in an article titled "Computing Machinery and Intelligence," in which he raised the question, Can machines think? Because the term *think* is so ambiguous, Turing proposed an objective way of answering his own question.

The Turing Test

Turing proposed that we play the "imitation game" to answer the question, Can machines (like computers) think? He asked that we imagine an interrogator asking probing questions to a human and to a computer, both hidden from the interrogator's view. The questions and answers are typed on a keyboard and displayed on a screen. The only information the interrogator is allowed is that which is furnished during the question-and-answer session. The human is instructed to answer the questions so as to attempt to convince the interrogator that he or she really is the human. The computer is programmed to respond as if it were human. If after a series of such tests the interrogator is unable to consistently identify the human responder, the computer passes the **Turing test** and can be said to think.

Weak Versus Strong Artificial Intelligence. What does it mean when a computer passes the Turing test for some human cognitive function? For example, if an interrogator cannot distinguish between a human and a computer with regard to thinking, reasoning, and problem solving, does that mean that the computer possesses those mental attributes just as humans do? No, say the proponents of **weak artificial intelligence**, who claim that, at best, a computer can only simulate human mental attributes. Yes, say the proponents of **strong artificial intelligence**, who claim that the computer is not merely (in this context) a tool used to study the mind (as the proponents of weak AI claim). Rather, an appropriately programmed computer really *is* a mind capable of understanding and having mental states. According to strong AI, human minds are computer programs, and therefore there is no reason



Courtesy of John Searle

John Searle

they cannot be duplicated by other, nonbiological, computer programs (see Henley, 1990). For the proponents of strong AI, computers do not *simulate* human cognitive processes; they *duplicate* them.

Searle's Chinese Room. **John Searle** (1980, 1990) describes his "Chinese Room" rebuttal to proponents of strong AI. Somewhat reminiscent of Leibniz, thinking, for supporters strong AI, is the manipulation of symbols according to rules, and because computer programs manipulate symbols according to rules, they think. According to strong AI, "The mind is to brain as the program is to the hardware" (Searle, 1990, p. 26). To refute this claim, Searle asks you to consider a language you do not understand—say, Chinese. Now suppose you are placed in a room containing baskets full of Chinese symbols, along with a rule book written in English telling how to match certain Chinese symbols with other Chinese symbols. The rules instruct you how to match symbols entirely by their shapes and do not require any understanding of the meaning of the symbols. "The rules might say such things as, 'take a squiggle-squiggle sign from basket number one and put it next to a squoggle-squoggle sign from basket number two'" (p. 26). Imagine further that there are people outside the room who understand Chinese and who slip messages in Chinese into your room, which you then manipulate according to your rule book. You then slip the results back out of the room. Searle likens the rule book to the computer program. The people who wrote the rule book are the "programmers," and you are the "computer." The baskets full of symbols are the "database," the messages slipped into the room are "questions," and the responses you slip out of the room are "answers."

Finally, imagine that your rule book is written in such a way that the "answers" you generate are indistinguishable from those of a native Chinese speaker. In other words, unknown to you, the symbols slipped into your room may constitute the question, What is the capital of France? and your answer, again unknown to you, was Paris. After several such questions and answers, you pass the Turing test for understanding Chinese although you are totally ignorant of Chinese. Furthermore, in your situation there is no way that you could ever come to understand Chinese because you don't have the requisites for learning the meaning of the symbols. Like a computer, you manipulate symbols but attach no meaning to them. Searle (1990) concludes,

> The point of the thought experiment is this: If I do not understand Chinese solely on the basis of running a computer program for understanding Chinese, then neither does any other digital computer solely on that basis. Digital computers merely manipulate formal symbols according to rules in the program.
>
> What goes for Chinese goes for other forms of cognition as well. Just manipulating the symbols is not by itself enough to guarantee cognition, perception, understanding, thinking and so forth. And since computers, qua computers, are symbol-manipulating devices, merely running the computer program is not enough to guarantee cognition. (p. 26)

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Any problem that can be stated in terms of formal symbols and solved according to specified rules can be solved by a computer, such as balancing a checking account or playing chess. The manipulation of symbols according to specified rules is called *syntax*. *Semantics*, on the other hand, involves the assignment of meaning to symbols. According to Searle, computer programs have syntax but not semantics. Human thoughts, perceptions, and understandings have a mental content, and they can refer to objects or events in the world; they have a meaning or, to use Brentano's term (Chapter 9), they have *intentionality*. A computer program (or you enclosed in the Chinese Room) simply manipulates symbols without any awareness of what they mean. Again, although a computer may pass the Turing test, it is not really thinking as humans think, and therefore strong AI is false. "You can't get semantically loaded thought contents from formal computations alone" (Searle, 1990, p. 28). Of course, not everyone accepts Searle's analysis. Indeed, another of Chomsky's contributions had been to demonstrate how much of what had traditionally been seen as semantics could be explained by syntactical rules and structures.

Nevertheless, for Searle, our brains are constructed so that they cause mental events: "Brains are specific biological organs, and their specific biochemical properties enable them to cause consciousness and other sorts of mental phenomena" (Searle, 1990, p. 29). Computer programs can provide useful simulations of the formal aspects of brain processes, but simulation should not be confused with duplication. "No one expects to get wet in a pool filled with Ping-Pong-ball models of water molecules. So why would anyone think a computer model of thought processes would actually think?" (p. 31).

Are Humans Machines?

The argument about whether machines (in this case, computers) can think reintroduces into modern psychology a number of questions that have persisted throughout our discipline's history. One such question is, What is the nature of human nature? As we have seen, one answer has been that humans are machines. Most of the English and French "Newtonians of the Mind" took Newton's conception of the universe as a machine and applied it to humans. For anyone who believes that humans are nothing but complex machines—and there have been many philosophers and psychologists with such a belief—there would be no reason that a nonhuman machine could not be built that would *duplicate* every human function. This might require placing a computer into a sophisticated robot so that it was embodied and could directly experience the world, but in principle, there is no reason a nonhuman machine could not duplicate every human function, because humans too are nothing but machines.

Humans, say such materialists, are nothing but physical systems. And, for the materialists, there is no "ghost in the machine" (that is, a mind); thus, there is no reason to wonder whether a nonhuman machine can be conscious or not. Neither nonhuman machines nor humans have a special capacity, "mind." Minds simply cannot exist if they are nonphysical in nature; only physical things exist. To suggest otherwise, say the materialists, is to embrace dualism. Being materialists, radical behaviorists do not deny that machines could be made that duplicate human *behavior*. However, such a machine could not have a causal mind any more than humans could and, therefore, talk of duplicating human consciousness is plain nonsense. For materialists, such as the radical behaviorists, both weak and strong AI are useless concepts.

Psychologists and philosophers who accept dualism may or may not find AI useful. Postulating a mental component to human nature does not require that such a component be unlawful. Most of the British empiricists and French sensationalists embraced mentalism, but the mental events they postulated were governed by the laws of association. Even being a rationalist does not preclude being a determinist concerning mental events. For example, Spinoza believed thought to be lawful, and therefore a machine analogy of the mind would not have been far-fetched for him. Similarly, the philosophers, like Kant, who divided the mind

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into various faculties were often dualists. However, these faculties were typically viewed as transforming sensory information in automatic, mechanistic, lawful ways, and therefore both the physical and mental aspects of humans were machine-like. In more recent times, the methodological behaviorists, like Tolman, who postulated cognitive events that mediated between stimuli and responses, followed in the tradition of the faculty psychologists. Thus, being a dualist does not preclude one from viewing humans as machines and thus embracing some form of AI.

Standing in opposition to using any form of machine as a model for understanding the human mind would be those rationalistic philosophers or psychologists who postulate a free will (like Descartes, who poses this very question). Also in opposition would be most romantic and existential philosophers, and the modern humanistic psychologists. Aside from postulating human free will, humanistic psychologists claim that there are so many important unique human attributes (such as creativity and the innate tendency toward self-actualization) that the very idea of machine simulation of human attributes is ridiculous and perhaps even dangerous. It may be dangerous because if we view humans as machines, we may treat them as machines; and if we treat them as machines, they may act like machines. According to the humanistic psychologists, this is what tends to happen when the methods and assumptions of the natural sciences are blindly applied to the study of humans. With such methods, humans are treated like physical objects (machines) and are thus desacralized. Most humanistic psychologists find the very idea of AI problematic.

COGNITIVE SCIENCE

There is no better example of how developments outside psychology can influence our discipline than the emergence of **information processing psychology**. Although individuals such as George Miller (1956) and Donald Broadbent (1957, 1958) had already used the computer metaphor to study human cognition, it is generally agreed that the 1958 article by Allen Newell, J. C. Shaw, and Herbert Simon importantly shaped information processing psychology. In their article, the authors claimed that the computer programs they developed solved problems the same way humans do. That is, they claimed that both the human mind and computer programs are general problem-solving devices. This claim was highly influential, and an increasing number of psychologists began to note the similarities between humans and computers: both receive input, process that input, have a memory, and produce output. For information processing psychologists, the term *input* replaces the term *stimulus*, the term *output* replaces the terms *response* and *behavior*, and terms such as *storage*, *encoding*, *processing*, *capacity*, *retrieval*, *conditional decisions*, and *programs* describe the information processing events such as memory and reasoning that occur between the input and the output. Most of these terms have been borrowed from computer technology. The information processing psychologist usually concentrates his or her research on normal, rational thinking and behavior and views the human as an active seeker and user of information.

As we have seen throughout this book, assumptions made about human nature strongly influence how humans are studied. The assumption that the mind or brain either is or acts like a computer demonstrates this point:

> Computers take symbolic input, recode it, make decisions about the recorded input, make new expressions from it, store some or all of the input, and give back symbolic output. By analogy, that is most of what cognitive psychology is about. It is about how people take in information, how they recode and remember it, how they make decisions, how they transform their internal knowledge states, and how they transform these states into behavioral outputs. The analogy is important. It makes a difference whether a scientist thinks of humans as if they were laboratory animals

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> or as if they were computers. Analogies influence an experimenter's choice of research questions, and they guide his or her theory construction. They color the scientist's language, and a scientist's choice of terminology is significant. The terms are pointers to a conceptual infrastructure that defines an approach to a subject matter. Calling a behavior a *response* implies something very different from calling it an *output*. It implies different beliefs about the behavior's origin, its history, and its explanation. Similarly, the terms *stimulus* and *input* carry very different implications about how people process them. (Lachman, Lachman, & Butterfield, 1979, p. 99)

Information processing follows in the rationalistic tradition, and, like most rationalist theories, information processing theory has a strong nativistic component:

> We do not believe in postulating mysterious instincts to account for otherwise unexplainable behavior, but we do feel that everything the human does is the result of inborn capacities, as well as learning. We give innate capacities more significance than behaviorists did. We think part of the job of explaining human cognition is to identify how innate capacities and the results of experience combine to produce cognitive performance. This leads us, especially in the area of language, to suppose that some aspects of cognition have evolved primarily or exclusively in humans. (Lachman, Lachman, & Butterfield, 1979, p. 118)

Note the similarity between the Gestalt position and the following statement of Lachman, Lachman, and Butterfield: "The human mind has parts, and they interrelate as a *natural system*" (1979, p. 128). Also note the similarity between Kant's philosophy and another statement made by Lachman, Lachman, and Butterfield: "Man's cognitive system is constantly active; it adds to its environmental input and literally *constructs* its reality" (1979, p. 128). In fact, considerable similarity exists between Kant's rationalistic philosophy and cognitive psychology. Many consider Kant to be a founding father: "When cognitive scientists discuss their philosophical forebears one hears the name of Immanuel Kant more than any other" (Flanagan, 1991, p. 181). As we saw in Chapter 6, Kant postulated a number of categories of thought (faculties of the mind) that act on sensory information, thereby giving it structure and meaning that it otherwise would not have. In other words, according to Kant, the faculties of the mind process information. It is Kant's philosophy that creates a kinship among Piaget's theory of intellectual development, Gestalt psychology, and information processing psychology.

The Return of Faculty Psychology. Largely because of its relationship with phrenology, faculty psychology came into disfavor among scientists and was essentially discarded by them along with phrenology. To some, discarding faculty psychology with phrenology was like throwing out the baby with the bath water. We just saw that information processing psychology marks a return to faculty psychology. The discovery that the brain is organized into many "modules" (groups of cells), each associated with some specific function such as face recognition, also marks a return to faculty psychology. As the noted philosopher Jerry Fodor (1983) observes,

> Faculty psychology is getting to be respectable again after centuries of hanging around with phrenologists and other dubious types. By faculty psychology I mean, roughly, the view that many fundamentally different types of psychological mechanisms must be postulated in order to explain the facts of mental life. Faculty psychology takes seriously the apparent heterogeneity of the mental and is impressed by such prima facie differences as between, say, sensation and perception, volition and cognition, learning and remembering, or language and thought. Since, according to faculty psychologists, the mental causation of behavior typically

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> involves the simultaneous activity of a variety of distinct psychological mechanisms, the best research strategy would seem to be divide and conquer: first study the intrinsic characteristics of each of the presumed faculties, then study the ways in which they interact. Viewed from the faculty psychologist's perspective, overt, observable behavior is an interaction effect par excellence. (p. 1)

In his influential book *How the Mind Works* (1997), Steven Pinker, perhaps currently cognitive psychology's best known spokesperson, also embraces faculty psychology: "The mind, I claim, is not a single organ but a system of organs, which we can think of as psychological faculties or mental modules" (p. 27). And, this approach has produced some excellent work in various "faculties," such as Eleanor Rosch's research on categorization (Rosch, 1978; Rosch & Mervis, 1975), work on embodied language (Johnson, 1987; Lakoff, 1987), as well as Kahneman and Tversky's work on reasoning (Kahneman & Tversky, 1972, 1973; Tversky & Kahneman, 1973). Indeed, the Israeli Daniel Kahneman (1934–) was the first person with a PhD in psychology to win the Nobel Prize.

The Mind–Body Problem Revisited

As you may have already noted, cognitive psychology brings the mind–body problem back into psychology—not that it ever completely disappeared. The radical behaviorists "solved" the problem by denying the existence of a causal mind. For them, so-called mental events are nothing but physiological experiences to which we assign cognitive labels. That is, the radical behaviorists "solved" the mind–body problem by assuming materialism or physical monism. Cognitive psychology, however, assumes the existence of mental events. These events are viewed sometimes as the by-products of brain activity (epiphenomenalism); sometimes as automatic, passive processors of sensory information (mechanism); and sometimes as what directly causes behavior (interactionism). In each case, both bodily events and mental events are assumed, and therefore the relationship between the two must be explained. A number of contemporary cognitive psychologists believe they have avoided dualism by noting the close relationship between certain brain activities and certain cognitive events (for example, Sperry, 1993). The fact that it appears likely that such a relationship will soon be discovered for all mental events is sometimes offered in support of materialism. Robinson (1986) explains why such reasoning is fallacious:

> This is hardly a justification for materialistic monism, since *dualism* does not require that there be no brain! Indeed, dualism does not even necessarily require that mental events not be the effects of neural causes. A modest dualism only asserts that there *are* mental events. To show, then, that such events are somehow caused by material events, far from establishing the validity of a monist position, virtually guarantees the validity of a dualist position. (pp. 435–436)

Replacing the term *mind–body* with the term *mind–brain* does little to solve the problem of how something material (the brain) can cause something mental (ideas, thinking). For an excellent historical review of the controversies concerning the nature of consciousness and the current status of those controversies, see Robinson (2007).

Over time, the information processing approach to psychology became a more general cognitive psychology centered around schema. For example, we have already noted Neisser's *Cognition and Reality* (1976), and computer scientist Roger Schank and social psychologist Robert Abelson showed the ubiquity of schema theory in their 1977 *Scripts*, *Plans*, *Goals*, *and Understanding*. Likewise, the intersection of computation, psychology, and neuroscience lead to new work in several longstanding areas, such as David Marr's (1945–1980) brilliant analysis of vision. Indeed, during the 1970s, an interdisciplinary field called **cognitive science** was emerging to study various cognitive processes. Paul Thagard (2005) describes cognitive science and its current status:

> Cognitive science is the interdisciplinary study of mind and intelligence, embracing

> philosophy, psychology, artificial intelligence, neuroscience, linguistics, and anthropology. Its intellectual origins are in the mid-1950s when researchers in several fields began to develop theories of mind based on complex representations and computational procedures. Its organizational origins are in the mid-1970s when the Cognitive Science Society was formed and the journal *Cognitive Science* began. Since then, more than sixty universities in North America have established cognitive science programs and many others have instituted courses in cognitive science. (p. ix)

Why an interdisciplinary approach? "How the mind works is the biggest puzzle that humans have ever tried to put together, and the pieces require contributions from many fields" (Thagard, 2005, p. 217). Thagard reviews the considerable success of cognitive science (pp. 133–141) but also notes some of its shortcomings. First, it lacks "A unified theory that explains the full range of psychological phenomena, in the way that evolutionary and genetic theory unify biological phenomena, and relativity and quantum theory unify physical theory" (p. 133). Second, an understanding of consciousness itself remains elusive: "No consensus has emerged, but some of the neurological and computational elements of a theory of consciousness are starting to appear" (p. 175). And last, the computer metaphor on which it is based fails to provide for the important role emotions play in everyday life:

> In humans, the evaluation of different states is usually provided by emotions, which direct us to what matters for our learning and problem solving. Computers currently lack such intrinsic, biologically provided motivation, and so can be expected to have difficulty directing their problem solving in nonroutine directions. (p. 221)

Once again grounding cognition in physiology, a different approach to artificial intelligence and psychology became central to cognitive science, an approach called connectionism.

CONNECTIONISM

Hebb's speculations concerning how cell assemblies and phase sequences develop (recall Chapter 18) have reemerged in one of cognitive science's most promising research areas—**connectionism**. Indeed, the cornerstone of one specific type of connectionist model is called **Hebb's rule**, which states the following: If neurons are successively or simultaneously active, the strength of the connections among them increases. Ironically, it was not original with Hebb.

You should recognize that Hebb's rule is based on the associative laws of contiguity and frequency that go back at least to Aristotle; and, as we saw in Chapter 5, David Hartley applied these associative principles to neural activity more than 250 years ago. Likewise, William James (1890/1950, Vol. 1, p. 566) covered the topic, and Pavlov's neurophysiological explanation of the development of conditioned reflexes followed Hartley and James very closely. Then of course there was Hull (recall Chapter 13), who like Hebb, could readily envision the application of his learning theory to machines.

Mentioned at the start of the chapter, McCulloch and Pitts (1943) showed how neurons, and networks of neurons, engage in logical operations that could be expressed mathematically. McCulloch and Pitts used the term *neurological networks* to reflect their interest in expressing neuronal activity mathematically. This effort to represent neural activity mathematically and, in turn, to relate that activity to human behavior, is essentially what modern connectionism attempts to do.

Hebb was well aware of the fact that the idea expressed in what became known as Hebb's rule was not original. In *The Organization of Behavior* (1949), he said,

> The general idea is an old one, that any two cells or systems of cells that are repeatedly active at the same time will tend to become "associated," so that activity in one facilitates activity in the other. The details of speculation that follow are

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> intended to show how this old idea might be put to work again. (p. 70)

Although the idea that neurons that are active together or in close temporal proximity become associated was not original with him, it was Hebb's version of that idea that most influenced connectionism:

> It remains true that many ideas fundamental to connectionism were set out by Hebb. At a very general level, his commitment to trying to account for psychological processes given certain neurophysiological constraints has endured. At a very specific level, Hebbian learning, as conveyed by the Hebb rule, continues to be applied even in the most recent systems. (Quinlan, 1991, p. 6)

Neural Networks

Connectionism utilizes as its model a system of artificial neurons called a **neural network**. There are typically three kinds of "neurons" in a neural network: input, hidden, and output. As with the brain, the associations among neurons within a neural network change as a function of experience. For Hebb, neurons become associated when the biochemistry of the synapses among them changes. In neural networks, synaptic changes are simulated by modifiable mathematical weights among the nodes in the network. After each presentation of input, neural networks are designed to detect which units within the network are active and to reorganize themselves according to Hebb's rule. Imagine, for example, the stimulation detected by your hand when grasping a pen, a cola can, and a baseball. A different pattern of sensory input forms for each object, and eventually the system (for simplicity, your hand) comes to differentiate the patterns of stimulation and associate them with the various objects held.

The influences within a neural network are arranged in a hierarchy. Hidden units mathematically convert the patterns of incoming activity they receive from the various input units into single output patterns, which they (the hidden units) then broadcast to the output units. At first, input into the network produces general activity with no predictable output. With experience, however, the weights among the connections within the network are modified according to Hebb's rule, and eventually, as illustrated by our hand example, output becomes correlated with input. Figure 19.1 shows a highly simplified neural network.

Connectionism represents a radical departure from what John Haugeland (1985) calls *good old-fashioned AI* (GOFAI). GOFAI has enjoyed many successes, most notably in what are known as expert systems. Whenever most relevant information is known, and rules for organization can be specified, cognitive science can build an impressive expert system—that is, a computer system that performs just as well as a human expert would in that limited domain. Your tax software and the AI in your computer games are likely expert systems.

GOFAI processes symbolic information according to rules, whereas neural networks process patterns of excitation and inhibition expressed as mathematical weights within the system. A shortcoming of GOFAI is that any disruption in the flow of information causes the entire system to fail. For example, if one rule is wrong, then anything utilizing that rule will also be wrong. Within neural networks, information processing occurs throughout the system and, therefore, substantial portions of the system would need to be destroyed for

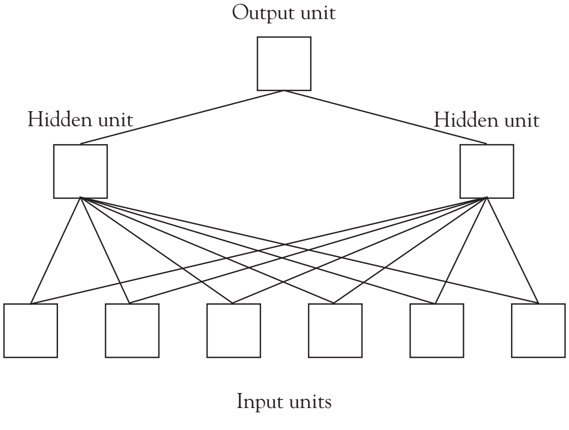

FIGURE 19.1 A highly simplified neural network.

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disruption to occur. For this reason, Lashley's principle of mass action (see Chapter 18) applies to neural networks as well as to real brains. The most important distinction between GOFAI and connectionism is in what they do: GOFAI systems reason about information they contain where connectionist systems can perform or simulate a number of human capabilities that GOFAI cannot—for example, learning and perception. In GOFAI systems representations of the schema that structure our cognitions are constructed by the program or programmers, whereas in connectionist systems they are created by experience. For Rumelhart, Smolensky, McClelland, and Hinton (1986)

> Schemata are not "things." There is no representational object which is a schema. Rather, schema emerge at the moment they are needed from the interaction of large numbers of much simpler elements all working in concert with one another. Schemata are not explicit entities, but rather are implicit in our knowledge and are created by the very environment they are trying to interpret—as it is interpreting them. (p. 20)

Within connectionism, learning is explained in terms of changing patterns of excitation and inhibition (represented by mathematical weights) within the neural network. Like the infant's brain, neural networks learn to represent recurring environmental events. Quinlan (1991) describes how learning occurs both in brains and in neural networks:

> It is straightforward to see how whole chains of associations and hierarchies of associations could be built up over time by the recursive application of the general principles of Hebbian learning. Two simultaneously active cells map onto a third, causing it to become co-active with a fourth. In turn the third and fourth cells map onto a fifth whose behaviour eventually comes to represent a whole pattern of associations. (p. 5)

Connectionist models existed in the 1950s and 1960s (for example, Rosenblatt, 1958), and they competed with GOFAI. However, after the publication of Minsky and Papert's (1969) careful criticism of one type of connectionist model (Rosenblatt's), interest in neural networks waned. In the 1980s, new developments in cognitive and computer science revived interest in parallel processing, and in 1986, David Rumelhart, James McClelland, and other members of the parallel distributed processing (PDP) group published their two-volume book *Parallel Distributed Processing: Explorations in the Microstructure of Cognition*. Dreyfus (1992) describes the enthusiasm with which this work was received:

> Rumelhart, McClelland, and the PDP Research Group's two-volume work, *Parallel Distributed Processing*, had 6000 backorders the day it went on the market in 1986, and over 45,000 sets are now in print. Like the dissolution of the Soviet Union, the speed of collapse of the GOFAI research program has taken everyone, even those of us who expected it to happen sooner or later, by surprise. (p. xiv)

Soon neural networks showed their ability to recognize patterns, objects, phonemes, and words; to process sentences; to learn concepts; to generalize; and even to speak. Practical applications were quickly embraced by industry and the military. Additionally, many of the neurophysiological speculations upon which neural networks are based (such as Hebb's rule) have come to be confirmed by observing the functioning of actual neurons (see, for example, Cleary, Hammer, & Byrne, 1989; Glanzman, 1995).

Back-Propagation Systems. Neural networks programmed in accordance with Hebb's rule are self-correcting; that is, patterns of output gradually match patterns of input, based on experience alone. But not all connectionist systems are programmed in that way. Many are **back-propagation systems** that utilize Hullian "reinforcement" as feedback concerning the program's performance. One example of a back-propagation system is NETtalk (see Sejnowski & Rosenberg, 1987).

Words are fed into the system, and their influence travels through the hidden units until they are coded into phonemes. A phoneme is the smallest unit of discernible sound within a language. This output (coded phonemes) is then fed into a voice synthesizer that produces actual speech sounds (phonemes). At first, the weights within the system are arbitrarily assigned and the output is gibberish. Training consists of adjusting the weights within the network so that the discrepancy between the input and the desired output (correct pronunciation) is systematically reduced. It is this corrective feedback that makes NETtalk a back-propagation system and not a system that learns automatically according to Hebb's rule. Clark (1990) summarized how NETtalk learned how to speak coherently:

> The network began with a random distribution of hidden unit weights and connections (within chosen parameters), i.e. it had no "idea" of any rules of text to-phoneme conversion. Its task was to learn, by repeated exposure to training instances, to negotiate its way around this particularly tricky cognitive domain (tricky because of irregularities, subregularities, and context-sensitivity of text —> phoneme conversion). And learning proceeded in the standard way, i.e. by a back-propagation learning rule. This works by giving the system an input, checking (this is done automatically by a computerized "supervisor") its output, and telling it what output (i.e. what phonemic code) it *should* have produced. The learning rule then causes the system to minutely adjust the weights on the hidden units in a way which would tend towards the correct output. This procedure is repeated many thousands of times. Uncannily, the system slowly and audibly learns to pronounce English text, moving from babble to half-recognizable words and on to a highly creditable final performance. (p. 299)

Connectionism is a diverse and complex field, and our discussion of it represents the briefest sketch. For a more comprehensive overview, especially as it applies to psychology, see Quinlan (1991). Although connectionism as an approach to AI has proven itself through myriad applications—some that you may have interacted with already today—as a model of human cognition it is not without critics. For example, many leading philosophers of psychology, such as Hubert Dreyfus (1992), the "black knight of AI," are still not impressed:

> Neural networks are almost as dependent upon human intelligence as are GOFAI systems, and their vaunted learning ability is almost illusory. What we really need is a system that learns on its own how to cope with the environment and modifies its own responses as the environment changes. (p. xxxix)

Nor is Searle (1992):

> Like the drunk who loses his car keys in the dark bushes but looks for them under the streetlight, "because the light is better here," we try to find out how humans might resemble our computational models rather than trying to figure out how the conscious human mind actually works. (p. 247)

Searle (1998) argues that connectionism, although much more powerful than earlier versions of AI, still employs only syntax (the manipulation of symbols). Therefore, he says, the problem of semantics (the meaning of symbols) posed by his Chinese Room thought experiment is still not solved. Even Jerry Fodor, who has been largely supportive of what he calls the Computational Theory of Mind (CTM), sees limits in explaining human cognition through any computational model:

> So … when I wrote books about what a fine thing CTM is, I generally made it a point to include a section saying that I don't suppose that it could comprise more than a fragment of a full and satisfactory cognitive psychology; and that the most interesting—certainly the hardest—problems about thinking are unlikely to be much illuminated by any kind of computational theory we are now able to imagine. I guess I sort of took it for

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> granted that even us ardent admirers of computational psychology were more or less agreed on that. (2000, p. 1)

Finally, Jerome Bruner (1990), who we recall was among those responsible for the resurgence of interest in cognitive psychology in the late 1950s and early 1960s, asserts that cognitive science has failed in its effort to explain human cognition because it has neglected the most important aspect of life—meaning:

> There is no question that cognitive science has made a contribution to our understanding of how information is moved about and processed. Nor can there be much doubt on reflection that it has left largely unexplained and even somewhat obscured the very large issues that inspired the cognitive revolution in the first place. So let us return to the question of how to construct a mental science around the concept of meaning and the processes by which meanings are created and negotiated within a community. (pp. 10–11)

SUMMARY

Throughout most of psychology's history, human cognition was studied philosophically. It was J. S. Mill who provided the framework within which human cognition could be studied scientifically. Fechner, Ebbinghaus, James, Bartlett, and Piaget were among the first psychologists to demonstrate that human cognition could be studied experimentally. Also included among the pioneers of experimental cognitive psychology were the Gestalt psychologists, Hebb, Wiener, Shannon, and Weaver. During the 1950s, interest in experimental cognitive psychology increased mainly because of the efforts of such individuals as George Miller, Broadbent, Lashley, Festinger, Bruner, and Chomsky, the humanistic psychologists, and the psychoanalysts. In 1960 Hebb urged that the rigorous scientific methods utilized by the behaviorists to study behavior be applied to the study of human cognition. Also in 1960, Miller and Bruner founded the Center for Cognitive Studies at Harvard. In 1962 and 1963, Egger and Neal Miller demonstrated that classical conditioning could not be understood in terms of associative principles alone. Rather, the information conveyed by the stimuli involved had to be considered. In 1967 Neisser synthesized the diverse findings within experimental cognitive psychology, using a few basic principles primarily from information theory. In 1965 Bruner, and in 1969 George Miller served as president of the APA, illustrating how far experimental cognitive psychology had come.

In 1950 Alan Turing created the field of AI. AI attempts to simulate or duplicate the intelligence exhibited by humans, using nonhuman machines such as computers. Turing proposed the "imitation game" as a means of determining whether a machine can think as a human does. If the answers to questions given by a machine (like a computer) are indistinguishable from those given by a human, the machine can be said to think. Those adhering to strong AI believe that nonhuman machines can duplicate human intelligence, and those adhering to weak AI believe that nonhuman machines can only simulate human intelligence. Searle argues that his thought experiment of the Chinese Room showed that computers manipulate symbols without assigning meaning to them, and therefore strong AI must be rejected. Whether or not AI is seen as a useful model for studying humans depends on one's view of human nature. According to materialists, such as the radical behaviorists, there is no reason machines cannot duplicate human behavior. However, efforts to construct machines that simulate or duplicate human consciousness must fail because no such causal process exists.

However, accepting a dualist position does not necessarily preclude the usefulness of AI, because many dualists are also mechanists. It is only those dualist positions that postulate unique features of the human mind (such as free will) that see AI as having little or no usefulness.

Information processing cognitive psychology developed from computer models. As the computer does, humans receive input; process that input by using various programs, strategies, schemata, memories, and plans; and then produce output. The major goal of the information processing psychologist was to determine the mechanisms humans employ in processing information. Information processing psychologists followed in the rationalistic tradition, and their work and assumptions showed similarities to Kantian philosophy, Gestalt psychology, Piaget's theory of intellectual development, and methodological behaviorism. Both faculty psychology and the mind–body problem reemerged as cognitive psychology became popular. In the late 1970s, information processing psychologists joined with researchers from other disciplines to form cognitive science.

Hebb's speculations concerning the neurological basis of learning influenced the most recent version of artificial intelligence—connectionism. Connectionism employs artificial neural networks consisting of input, hidden, and output units. One type of neural network "learns" according to Hebb's rule. That is, the mathematical weights among units that are active together are increased. The result is that consistent patterns of input into the network gradually produce consistent patterns of output. Back-propagation networks do not apply Hebb's rule but utilize reinforcement instead. An example of a back-propagation system is NETtalk. Although neural networks function more like brains than GOFAI does and are capable of learning, many remain skeptical that any form of AI can reasonably duplicate or even simulate human intelligence.

DISCUSSION QUESTIONS

1. Justify the contention that psychology has almost always been concerned with studying human cognition.
2. Give examples of early efforts (before 1950) to study human cognition experimentally.
3. Give examples of events that occurred in the 1950s that contributed to the development of experimental cognitive psychology. Include a discussion of social psychology.
4. Describe the pivotal events that occurred in the 1960s that contributed to the current popularity of experimental cognitive psychology.
5. Define each of the following: artificial intelligence (AI), strong AI, and weak AI.
6. What is the Turing test, and for what was it used?
7. Describe Searle's thought experiment involving the Chinese Room. What, according to Searle, does this experiment prove?
8. Which philosophies would tend to support the position of strong AI? Weak AI? Which would deny the usefulness of either type of AI?
9. What are the major tenets of information processing psychology?
10. Why can cognitive psychology be seen as following in the tradition of Kantian philosophy? Why can it be seen as marking a return to faculty psychology? A return to the mind–body problem?
11. What is cognitive science?
12. What is connectionism, and how does it contrast with GOFAI?
13. Describe an artificial neural network and then discuss how such a network learns by applying Hebb's rule.
14. Within connectionism, what is a back-propagation model? Give an example.
15. Which of the criticisms of GOFAI remain viable when directed against connectionism?

SUGGESTIONS FOR FURTHER READING

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GLOSSARY

Artificial intelligence (AI) A branch of computer science that investigates the extent to which machines can simulate or duplicate the intelligent behavior of living organisms. (*See also* **Strong artificial intelligence** and **Weak artificial intelligence**.)

Attribution For Heider, the basic patterns of explanation we use to make sense of the world. The fundamental attributions include *effort*, *ability*, *task*, and *luck*.

Back-propagation systems Neural networks that are programmed to learn by systematically reducing the discrepancy between their output and some desired output represented by a model or "teacher." Such systems learn by corrective feedback instead of by applying Hebb's rule.

Bartlett, Sir Frederic Charles (1886–1969) One of the first modern cognitive psychologists. Noted for his use of schema to explain the reconstructive nature of memory.

Bruner, Jerome (b. 1915) Along with Miller and Bartlett, one of the first cognitive psychologists. Among his contributions were the popularization of Piaget and Vygotsky.

Chomsky, Noam (b. 1928) Trained as linguist, Chomsky wrote a review of Skinner's work on language, showed the limits of a behavioral explanation and beginning the "cognitive revolution." Much of modern psycholinguistics centers around Chomsky's theory of language.

Cognitive science An interdisciplinary approach to studying the mind and mental processes that combines aspects of cognitive psychology, philosophy, artificial intelligence, neuroscience, linguistics, and computer science.

Connectionism The most recent type of AI that utilizes artificial systems of neurons called neural networks. As contrasted with GOFAI, which employed the sequential processing of information according to specified rules, new connectionism employs the brain as a model. That is, the processing of information within a neural network is distributed throughout the entire network. Like the brain, neural networks are capable of learning; this was not true of GOFAI. (*See also* **Hebb's rule** and **Neural network**.)

Hebb's rule Hebb's contention that neurons within the brain that are simultaneously or successively active

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become associated. One type of neural network applies this rule by adjusting the mathematical weights of units that are simultaneously or successively active. The result is that consistent input gradually produces consistent output. (*See also* **Neural network**.)

Information processing psychology The approach to studying cognition that follows in the tradition of faculty psychology and methodological (mediational) behaviorism and typically employs the computer as a model for human information processing.

Miller, George, A. (b. 1920) Did pioneering research on information processing in the 1950s and 1960s that significantly enhanced the popularity of cognitive psychology.

Neisser, Ulric (1928–2012) Noted cognitive psychologist. Authored two classic textbooks and advocated for cognitive research that was both applied and ecologically valid.

Neural network A system of input, hidden, and output units that is capable of learning if the mathematical weights among the units are systematically modified either according to Hebb's rule or by back-propagation. (*See also* **Hebb's rule** and **Back-propagation systems**.)

Piaget, Jean (1896–1980) Focused on cognitive development, and how schemata evolve during maturation and through experience. Posited a well-known stage theory of intellectual development in children from birth to adolescence.

Searle, John (b. 1932) With his famous "Chinese Room" thought experiment, sought to demonstrate that computer programs can simulate human thought processes but not duplicate them. Computer programs, he says, can only manipulate symbols according to rules (syntax), whereas humans assign meaning to symbols (semantics). Therefore, he accepts weak artificial intelligence and rejects strong artificial intelligence. (*See also* **Strong artificial intelligence** and **Weak artificial intelligence**.)

Strong artificial intelligence The contention that machines (such as computers) can duplicate human cognitive processes.

Turing, Alan (1912–1954) Turing is considered the father of Artificial Intelligence in computer science and psychology. Among his contributions was the **Turing test**.

Turing test A test devised by Turing (1950) to determine whether a machine can think. Questions are submitted to both a human and a machine. If the machine's answers are indistinguishable from those of the human, it is concluded that the machine can think.

Weak artificial intelligence The contention that machines (such as computers) can simulate human cognitive processes but not duplicate them.

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20

Psychology Today

As the various courses at your school surely attest, psychology today is diverse (Abnormal, Behavioral, Cognitive, Developmental, Evolutionary, Forensic, and so on). Although it is tempting to see such diversity as a by-product of the modern age, psychology has always been diverse. In psychology's history, there has seldom been an extended period when all theorists were focused on a single question, or accepted a single paradigm. Perhaps the closest psychology ever came to being a single-paradigm discipline was during the Middle Ages, when departures from the view of church dogma were simply not tolerated. Others might point to behaviorism's domination of U.S. psychology from about 1930 through the 1950s. Although behaviorism was extremely powerful, there were always a few influential critics and alternative views, albeit on the periphery.

One thing that distinguishes psychology today from psychology during the period when the great schools (structuralism, functionalism, behaviorism, etc.) existed is the relatively peaceful coexistence of psychologists holding dissimilar views. During the early 20th century, when several psychological schools existed simultaneously, open hostility often arose between rivals. Today, a spirit of **eclecticism** often prevails. The eclectic chooses from diverse sources those ideas and techniques that are most effective in dealing with a topical problem. It is this eclecticism toward solving psychology's current concerns that Sternberg and Grigorenko (2001) believe strengthens contemporary psychology as a discipline. It is also the approach suggested by postmodernism. We will have more to say about both Sternberg and Grigorenko and postmodernism later in this chapter.

DIVISIONS OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

Table 20.1 lists the 54 divisions of the APA, which give a clear indication of the diversity of psychology today (although the divisions go up to 56 in roughly chronological order, there is no division 4 or 11, making a total of 54). Note, for example, that divisions include Experimental Psychology (3), Society for the Psychology of Aesthetics, Creativity and the Arts (10), Society for Military Psychology (19), Psychopharmacology and Substance Abuse (28), Humanistic Psychology (32), Society for the Psychology of Women (35), and Psychoanalysis (39). There is no specific APA

TABLE 20.1 Divisions of the American Psychological Association

Society for General Psychology
Society for the Teaching of Psychology
Experimental Psychology
Evaluation, Measurement, and Statistics
Behavioral Neuroscience and Comparative Psychology
Developmental Psychology
Society for Personality and Social Psychology
Society for the Psychological Study of Social Issues
Psychology and the Arts
Society of Clinical Psychology
Society of Consulting Psychology
Society for Industrial and Organizational Psychology
Educational Psychology
School Psychology
Society of Counseling Psychology
Psychologists in Public Service
Military Psychology
Adult Development and Aging
Applied Experimental and Engineering Psychology
Rehabilitation Psychology
Society for Consumer Psychology
Theoretical and Philosophical Psychology
Division of Behavior Analysis
History of Psychology
The Society for Community Research and Action: Division of Community Psychology
Psychopharmacology and Substance Abuse
Psychotherapy
Society of Psychological Hypnosis
State Psychological Association Affairs
Humanistic Psychology
Mental Retardation and Developmental Disabilities
Population and Environmental Psychology
Society for the Psychology of Women
Psychology of Religion
Child, Youth, and Family Services
Health Psychology
Psychoanalysis
Clinical Neuropsychology
American Psychology—Law Society
Division of Independent Practice
Family Psychology
Society for the Psychological Study of Lesbian, Gay, and Bisexual Issues
Society for the Psychological Study of Ethnic Minority Issues
Media Psychology
Exercise and Sport Psychology
Society for the Study of Peace, Conflict, and Violence: Peace Psychology Division
Group Psychology and Group Psychotherapy
Division of Addictions
Society for the Psychological Study of Men and Masculinity
International Psychology
Society of Clinical Child and Adolescent Psychology
Society of Pediatric Psychology
American Society for the Advancement of Pharmacotherapy
Trauma Psychology

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division of cognitive psychology, but if there were, it undoubtedly would have been among the fastest growing from the 1960s to the present (see, for example, Robins, Gosling, & Craik, 1999). Although some APA members have no divisional affiliation, for most APA members it is common to belong to several divisions. When affiliates (foreign psychologists, high school psychology teachers, and undergraduate and graduate psychology students) are added to the APA membership, the number exceeds 137,000—a far cry from the few dozen individuals who founded the APA in 1892 at Worcester, Massachusetts, under the leadership of G. Stanley Hall. There are now more divisions of the APA (54) than there were charter members (31). Incidentally, psychology continues to be one of the science and engineering fields with the highest number of new PhDs obtained by women. In 1990, 58% of new PhDs in psychology were obtained by women. In 1999, the figure grew to 66% (Kohout, 2001) and by 2005, it had grown to 72% (Cynkar, 2007).

BASIC AND APPLIED PSYCHOLOGY

As we saw in Chapter 8, interest in sensory physiology was stimulated by the discovery of individual differences in the observations made by astronomers. The scientific investigation that followed, however, was concerned with sensation and perception in general, not with individual differences. Such was the case with the work of Müller, Helmholtz, Weber, Fechner, and Donders, all of whom significantly influenced Wundt. When Wundt founded psychology as an independent discipline in 1879, he saw its purpose as explaining the human mind in general; he had little or no interest in individual differences or in applied psychology. This was not true of all Wundt's students however, including those from the United States. Typically, after receiving their PhDs under Wundt's supervision, students from the U.S. returned home and pursued their own interests, including individual differences and applied psychology (for example, Cattell, Hall, and Witmer, as well as Walter Dill Scott that we consider later in this chapter).

When Münsterberg eventually went to the United States, he did as much as anyone to develop applied psychology (recall Chapter 11), and he too received his doctorate under Wundt's supervision. Other students of Wundt would go on to applied work in Europe. For example, Emil Kraeplin (Chapter 15) is considered one of the founders of modern psychiatry. From psychology's very inception, there was tension between those wanting psychology to be a pure science detached from practical concerns (such as Wundt) and those wanting psychological principles to be applied to practical matters.

The fact that Hall, Münsterberg, Cattell, and Witmer were among the original members of the APA makes it clear that there was considerable early interest in applied psychology among U.S. psychologists. Functionalism, under the influence of evolutionary theory, was very concerned with individual differences, and many functionalists had an active interest in applied psychology. It should be noted that one could be interested in individual differences from a purely scientific perspective without concern for their practical implications (as Darwin was); but within psychology in the United States, interests in individual differences and applied psychology have usually been closely related.

However, Titchener, also an original member of the APA, was even more disdainful of applied psychology than was his mentor, Wundt. So upset was Titchener by the APA's embracing of applied psychology that he refused to participate in any of its activities. Instead, he created his own organization, The Experimentalists, whose members pursued their interests in pure, scientific psychology—as Titchener defined it.

Note that no early psychologist argued for applied psychology *instead of* pure, scientific psychology. These psychologists knew the struggle that psychology had had in differentiating itself from philosophy and religion, and they believed that anything in psychology worth applying came from its scientific base. For them, and for scientifically oriented psychologists ever since, science came first and applications came second. It was for this reason that the stated goal of the original APA was "to promote psychology as a science."

In 1896, only four years after the founding of the APA, Witmer created the first psychology clinic and shortly thereafter coined the term *clinical psychology*. Witmer worked primarily with children with speech, motor, or learning disorders. He used whatever rudimentary tests and experimental principles were available to help diagnose, and then to solve, those problems; he "[groped] for adequate techniques as he went along" (McReynolds, 1997, p. 854). Typically, Witmer created special educational conditions to "treat" the problems he diagnosed. As we noted in Chapter 15, in addition to his contributions to early clinical psychology, Witmer also made significant contributions to school psychology and special education. In any case, neither Witmer nor any other psychologist at the time engaged in psychotherapy; everyone agreed that the treatment of disease, both physical and mental, was the province of the medical profession. In fact, psychotherapy was rarely performed by clinical psychologists until after World War II. Witmer nicely exemplifies the attitude of early psychologists in the United States toward applied psychology. First came rigorous, scientific training, and second came the attempt to apply scientific knowledge to the solution of practical problems—in Witmer's case, attempting to help troubled individuals.

World War I greatly enhanced the growth and popularity of psychology. In December 1916, shortly before the United States entered the war, G. Stanley Hall addressed a joint session of the APA and the American Association for the Advancement of Science (AAAS). He argued that the utilization of applied psychology could increase military efficiency. Even psychoanalytic theory, he said, could be used to predict which soldiers would break down under fire. His address was well received by both scientists and the popular media (Ross, 1972). In March 1917, Hall launched the *Journal of Applied Psychology*, the first journal in the United States devoted to the problems of business and the measurement of vocational aptitudes. A variation of the latter was to represent psychology's major contribution to the war effort. We saw in Chapter 10 how, under the leadership of Yerkes, psychology became deeply involved in the evaluation of soldiers using the Army Alpha and Army Beta intelligence tests.

Even prior to the war, a connection between psychology and industry had already been formed. In 1910 Walter Dill Scott (1869–1955) published *Human Efficiency in Business*. Parallel to Yerkes' work, during World War I, Scott also assisted the military with personnel selection. Initially trained by Wundt and associated with Titchener, Scott later worked with the functionalist Walter Van Dyke Bingham (1880–1952) at the Carnegie Institute of Technology. Like Scott, Bingham's career was focused on the application of psychology to business matters (such as marketing and engineering) and to the military. Not only was he part of Yerkes' group in WW I, but he also helped construct the Army's General Classification Test which was used to match recruits to duties in WW II.

Russian born, Morris Viteles (1898–1996) completed his PhD under Witmer. Viteles was an early psychological consultant to a variety of famed businesses including The Bell Telephone Company and the Yellow Cab Company. His books, including *Industrial Psychology* (1932) and *Motivation and Morale in Industry* (1953), would become major works in applied psychology. Perhaps the most famous of all these early industrial applications came from productivity research done in the mid 1920s at the Hawthorne Works of the Western Electric Company, a division of American Telephone and Telegraph (which you now know as AT&T). Often called the **Hawthorne Effect**, it was discovered that particular changes in lighting or work breaks matters less than employee perceptions of such changes. That is, when employees knew that they were being observed and that attempts were being made to increase their productivity, they responded positively no matter what changes were tried.

During the 1930s, applied psychologists continued as they had in the 1920s, serving often as testers and evaluating juvenile offenders, troubled children, and people seeking guidance about their intelligence, personality, or vocational aptitude. Obviously, psychological testing developed far beyond the few early tests created by Binet,

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Terman, and others (including the phrenologists, as noted in Chapter 8). Testing became a major industry, and this did not please many scientifically oriented psychologists, who generally viewed testing as inferior to laboratory research. Scientific psychology had always been associated with colleges and universities (thus the terms *academician* and *experimental psychologist* are often used synonymously). Tests allowed applied psychologists to work outside of the university setting in industry, schools, and clinics or to be self-employed.

As the number of applied psychologists, including clinicians, grew, they demanded greater recognition and status within the APA. When this recognition was not forthcoming, applied psychologists began to create their own organizations. The first, the American Association of Clinical Psychologists (AACP), was established in 1917 but disbanded in 1919 when the APA formed its first division, the clinical division. The resulting peace lasted until 1930, when a group of applied psychologists from New York formed the Association of Consulting Psychologists (ACP). The ACP sought to establish professional and ethical standards for practitioners of psychology and began publication of the *Journal of Consulting Psychology* in 1937. Members of the clinical division of the APA were frustrated in their efforts to have that organization define and set standards for practitioners of psychology; so in 1937, they left the APA and joined with the ACP to create the American Association of Applied Psychology (AAAP), organized into four sections corresponding to consulting, clinical, educational, and business and industrial psychology. In 1938 the AAAP took over the publication of the *Journal of Consulting Psychology*.

In 1925 the APA had created the category of *associate* member for psychologists with a doctorate but with no scientific publications beyond the dissertation. Associates had no voting privileges within the APA. Most applied psychologists were associates because they tended not to do research, and they were resentful of their second-class status. In 1941, in an effort to reunify psychology, the APA removed the requirement for full membership that an applicant had to publish research beyond the PhD dissertation. Instead, one became eligible for full membership either through publication of scientific research *or* by having a doctorate plus five years' "contribution" to psychology as an associate member. The availability of full membership in the APA based on practical experience was generally viewed as a significant step toward accepting applied psychologists as equals.

In 1944, in a further attempt to unify the disparate interests of psychologists, the APA organized itself into 18 divisions, each with its own president and officers. Further, the stated purpose of the APA was changed to what it is today—"To advance psychology as a science, as a profession, and a means of promoting human welfare." Finally, a new journal, *American Psychologist*, first published in January 1946, was created as the voice of the new, unified psychology. The reorganization of the APA into relatively independent divisions satisfied the applied psychologists, and in 1944 the AAAP disbanded by merging with the APA.

After World War II, the need for psychotherapy among returning veterans far exceeded the capacity of psychiatrists and psychoanalysts to deal with it. Rogers (1944) estimated that as many as 80% of returning veterans requested counseling of some kind. He noted that veterans needed help in readjusting to civilian life; were often bitter because few people at home realized the horrors of combat; and expressed restlessness, disturbed sleep, excessive emotionality, and marital and family problems. Also, veterans who had suffered disabling injuries often needed psychological as well as physical therapy. In 1946 the Veterans Administration (VA) responded to the emergency by funding training programs at leading universities to train clinical psychologists whose jobs would include psychotherapy as well as diagnosis. Now the APA was confronted with a task it had avoided for decades—defining the professional psychologist and setting standards for his or her training and practice. We will see shortly that the question concerning clinical psychologists' training has still not been answered to everyone's satisfaction.

When clinical psychologists became involved in psychotherapy, they had little experience to draw upon. Most clinicians knew something about Freud, and his ideas were commonly utilized. Garfield (1981) commented on the domination of psychoanalysis following World War II:

> The most important and influential orientation in the 1940s was that of psychoanalysis. Psychoanalytic theory was the dominant force in psychiatry in the postwar period and was embraced by a large number of clinical psychologists. To a large extent, and for all practical purposes, there was no rival orientation. (p. 176)

As late as 1960, a survey indicated that 41% of clinical psychologists still adhered to a psychoanalytic orientation (Kelly, 1961). Despite rather serious controversies (see Chapter 16), psychoanalysis continues to be a formidable influence in both contemporary psychiatry and clinical psychology.

In 1942 Rogers developed his client-centered therapy, and it soon began competing successfully with psychoanalysis as a therapeutic technique. Other psychologists, such as George Kelly, simply invented their own techniques as they went along. Currently, the therapeutic techniques clinical psychologists use reflect at least the following perspectives, each with several subcategories: psychoanalytic, behavioristic, cognitive, humanistic, and existential.

Before the end of World War II, clinical psychologists were subservient to psychiatrists, who dominated the mental health profession. When clinical psychologists began to engage in psychotherapy, they entered into competition with psychiatrists and therefore with the medical profession. There followed a number of battles (often in the courts) concerning the kinds of services that psychologists could provide. For example, Could psychologists admit and release patients into and out of mental institutions? Could psychologists act as expert witnesses in court on matters of mental health? Were clinical psychologists entitled to third-party payment for their services (for example, from insurance companies)? Could clinical psychologists legally administer medication?

Until recently, clinical psychologists had won all their battles with psychiatrists except the last one: psychiatrists could prescribe medication, but clinical psychologists could not. However, in 2002, New Mexico became the first state in which psychologists were granted prescription privileges, and in 2004 Louisiana became the second. In addition, most states psychological associations now have prescription-privilege task forces working toward such legislation. One of the newer APA divisions, the American Society for the Advancement of Pharmacotherapy, facilitates and anticipates the inevitability of widespread prescription privileges among clinical psychologists. As matters now stand, then, psychologists either have, or could soon have, most of the privileges that psychiatrists have.

The elimination of the prescription restriction is considered especially important because of the present concern with health care costs. Research has shown that medication is often at least as effective as psychotherapy in treating mental disorders. For example, some forms of depression, perhaps the most common mental disorder of our time, have been effectively treated by antidepressant drugs (for example, Klein, Gittelman, Quitkin, & Rifkin, 1980; Morris & Beck, 1974). Similarly, Baxter and his coauthors (1992) demonstrated that medication is as effective as behavior therapy in treating patients with obsessive-compulsive disorders. Finally, Reisman (1991) states, “It is no exaggeration to say that the treatment of schizophrenia was remarkably altered by the use of drugs. Return of the patient to the community and maintaining the patient within the community were feasible goals” (p. 318). The important point is that if it can be demonstrated that certain mental disorders can be effectively and economically treated by drugs, clinical psychologists are at a disadvantage by not being able to prescribe them.

However, there is currently intense debate among those advocating medication as treatment for mental disorders (such as depression), those advocating psychotherapy, and those advocating a combination of the two. For the flavor of this debate, see Antonuccio (1995), Hayes and Heiby (1996), Lorion (1996), or Munoz, Hollon, McGrath, Rehm, and Vander Bos (1994). We have in this debate a modern manifestation of the old tension between the medical and psychological models of mental illness. Physicians tend to view mental disorders such as depression as illnesses or diseases, and they advocate treating disorders with medication. Psychologists often view mental disorders as resulting from life's circumstances (such as economic frustration, marital conflict, and personal loss), and they advocate treating disorders with therapy. Of course, many accept elements of both models and thus advocate a choice between, or a combination of, the two kinds of treatment. For discussions of the history of psychologists' efforts to gain prescriptive privileges, the training necessary for such privileges, and the debate concerning its usefulness, see Sammons, Paige, and Levant (2003).

Training Clinical Psychologists

As we have seen, Witmer established a tradition in which clinical psychology would be closely aligned with scientific or experimental psychology. Then the person performing the research and the person applying the knowledge gained from the research was often the same person, as was true for Witmer. This tradition of scientist-practitioner was reconfirmed in 1949 at the Boulder Conference on Training in Clinical Psychology sponsored by the APA. The Boulder model upheld that clinicians should obtain the Doctor of Philosophy (PhD) in psychology, which meant that they were trained in research methodology as any other psychologist was.

Increasingly, however, clinicians and students of clinical psychology questioned the need to be trained in scientific methodology in order to be effective practitioners. As early as 1925, Loyal Crane argued for the establishment of a special degree to be earned by applied psychologists as opposed to scientifically oriented psychologists, but "the response to Crane's plea was imperceptible" (Reisman, 1991, p. 161). The professional degree that Crane suggested was later called the **Doctor of Psychology (PsyD)**. In 1968 the University of Illinois offered the first PsyD degree, and in 1969 the California School of Professional Psychology (CSPP) was founded. The CSPP was significant not only because it offered the PsyD degree but because it existed independently of any college or university. Problems associated with the creation of the PsyD degree and with free-standing professional schools needed to be addressed, and a second conference on the training of clinical psychologists was held in Vail, Colorado, in 1973. At this conference, two decisions were made that broke radically from the tradition of clinicians as scientists-practitioners: (1) professional schools (like CSPP) that could offer advanced degrees in clinical psychology were sanctioned, and they would be administratively autonomous from university psychology departments; and (2) the PsyD degree was recognized.

The PsyD degree provides professional training for clinical psychologists but without the exposure to research methodology typical of training for the PhD. Proponents of the PsyD indicated that the degree was equivalent to the Doctor of Medicine degree (MD), where practitioners of medicine apply the principles of biology, chemistry, pharmacology, and other scientific fields to the treatment of physically ill persons. The PsyD would have a similar relationship to scientific psychology; that is, the PsyD would apply principles discovered by experimental psychologists to the treatment of disturbed individuals. After the Vail decision, professional schools of psychology became very popular, and as early as 1979, there were 24 such schools in California alone (Perry, 1979). As of 2000, the number of institutions granting the PsyD degree had grown to more than 50 and the number of PsyDs that have been awarded was approximately 9,000 (Murray, 2000).

Although the PsyD degree is increasingly popular, the training of clinicians as scientist-practitioners continues to dominate clinical programs (Baker & Benjamin, 2000; O'Sullivan & Quevillon, 1992). In 1990 a conference was held in Gainesville, Florida, to clarify aspects of the scientist-practitioner model that the Boulder conference had left open. Participants at the Gainesville conference reaffirmed the Boulder model as the one most appropriate for the training of professional psychologists (Belar & Perry, 1992).

The decisions to establish the PsyD and professional schools of psychology independent of university psychology departments remain highly controversial (see, for example, Fox, 1994; or Meehl, 1971). Shapiro and Wiggins (1994) argue that the current degree situation in psychology is confusing to both professionals and the public. For example, some PhDs are scientists and some are practitioners, but almost all PsyDs are practitioners. They propose that "all practitioners of psychology be clearly identified as doctors of psychology and hold the appropriate PsyD degree.… The PhD degree in psychology … should be reserved for individuals who are qualified to enter a career in research and scholarship" (p. 209). For arguments opposing the PsyD, see Belar and Perry (1991), and for concerns about the quality of training in PsyD programs, see Peterson (2003) or Kenkel, DeLeon, Albino, and Porter (2003).

No matter how the question of clinical training is ultimately resolved, it is clear that practitioners of psychology now dominate the membership of the APA. In 1940 about 70% of APA members worked in academia and were associated with scientific psychology; by 1985 only about 33% did. Currently, the vast majority of APA divisions reflect applied (mainly clinical) psychology, whereas only a minority reflect academic, research-oriented psychology. Shapiro and Wiggins (1994) indicate that nearly 70% of APA members identify themselves as health care providers. It is only natural, therefore, that the APA expend considerable resources addressing the needs of psychology's practitioners. The historic shoe is now on the other foot. Instead of practitioners believing they are second-class members of the APA, many scientifically oriented psychologists believe they are.

As early as 1959, a group of scientific psychologists, believing that the APA no longer adequately represented their interests, formed their own organization—the Psychonomic Society, under the leadership of Clifford T. Morgan and William Verplanck. The society held its first conference in 1960 and soon began publishing its own journal, *Psychonomic Science*. In 1988 a group of scientific psychologists founded the American Psychological Society (APS) with Janet Taylor Spence as its first president (Spence had been president of the APA in 1984). This national organization, dedicated to scientific psychology, held its first convention in 1989 in Alexandria, Virginia, and began publication of its journal *Psychological Science* in 1990. Recently, the name of the organization was changed from American Psychological Society to Association for Psychological Science (still APS). Membership in APS rose from an initial 500 to approximately 23,000 in 2012.

We see that the tension between pure, scientific psychology and applied psychology that characterized psychology in its earliest days is still very much alive. It may be unduly optimistic to hope this tension will ever be completely resolved. Perhaps the discord is inevitable because psychology embraces at least two basically incompatible cultures.

Psychology's Two Cultures

Given contemporary psychology's great diversity, what is it that inclines a particular psychologist toward one brand of psychology as opposed to another—to say clinical or experimental? A case can be made that it is a psychologist's personality or biography that, to a large extent, determines the choice. James once said that the single most informative thing you could know about a person is his or her **Weltanschauung**, or worldview. According to James, it is a philosopher's temperament that determines what type of *Weltanschauung* he or she has and thus the type of philosophy he or she will be inclined toward. As we saw in Chapter 11, James (1907/1981) argued that philosophers can be divided into two general groups according to their temperaments: the tender-minded and the tough-minded. James believed that tension between tender-minded and tough-minded philosophers has existed throughout history: "The tough think of the tender as sentimentalists and soft-heads. The tender feel the tough to be unrefined, callous, or brutal" (1907/1981, p. 11). In 1923 Karl Lashley discussed the reason some psychologists accept a mechanistic brand of psychology (such as Watson's) and others accept a purposive brand (such as McDougall's). Lashley reached much the same conclusion about psychologists that James had reached about philosophers: "It is wholly a matter of temperament; the choice is made upon an emotional and not a rational basis" (1923, p. 344).

The British scientist-novelist C. P. Snow (1964) was so impressed by the different ways scientists and literary intellectuals (such as novelists) embraced the world that he concluded they actually represented two distinct cultures—like the two conflicting temperaments James noted among philosophers. Snow observed that one of these temperaments (tender-minded) characterizes members of the humanities and the other (tough-minded) characterizes scientists, making meaningful communication between the two groups all but impossible.

In turn, many psychologists have been struck by Snow's ideas. For example, Cronbach's APA Presidential address (1957; see Chapter 10) contrasted the correlational methods often used by ideographic researchers with the experimental designs preferred by nomothetic psychologists. And, Gregory Kimble (1917–2006) provided evidence that James's two temperaments, Snow's two cultures, and even Kuhn's (1996) incommensurability among competing scientific paradigms could all be related.

Kimble (1984) administered a scale that measured the extent to which various psychologists and students of psychology accepted rigorous scientific values as opposed to humanistic values. The scale was administered to undergraduate students enrolled in an introductory psychology course; officers of all divisions of the APA; and members of Division 3 (Experimental Psychology), Division 9 (Society for the Study of Social Issues), Division 29 (Psychotherapy), and Division 32 (Humanistic Psychology). The students showed a slight inclination toward humanistic values, and APA officers (from all APA divisions collectively) showed an even more slight inclination toward scientific values. When data from members of individual APA divisions were analyzed, however, the results were more dramatic.

Scores for members of Division 3 (Experimental Psychology) were strongly biased in the direction of scientific values. Almost the opposite was true for the members of the other divisions tested. Scores for members of Division 9 (Society for the Study of Social Issues) were moderately biased in the direction of humanistic values. Scores for members of Division 29 (Psychotherapy) were strongly biased in the direction of humanistic values, as were scores for members of Division 32 (Humanistic Psychology). To use James's terminology, experimental psychologists tend to be tough-minded, and humanistic psychologists and psychotherapists tend to be tender-minded. Kimble (1984) concluded that two essentially incommensurable cultures exist in psychology. If Kimble's conclusion is correct, it would explain the historic tension between scientific and applied psychologists.

However, dividing philosophers, psychologists, or educated people into just two categories is a gross oversimplification. Snow realized this problem, saying that "the number 2 is a very dangerous number.... Attempts to divide anything into two ought to be regarded with much suspicion" (1964, p. 9). Kimble agreed, saying that the appearance of just two cultures in psychology was created by the careful selection of the APA divisions he evaluated. Although some psychologists fall at either end of the scientific-humanistic continuum, most psychologists would fall at various points in between. Instead of describing psychology in terms of two cultures, a description in terms of several cultures would be more accurate. Apparently, psychology's history and the Zeitgeist have combined to create a psychological smorgasbord, and it is the psychologist's personality that determines which items in that smorgasbord are appealing. Of course, the same is true for students of psychology.

PSYCHOLOGY'S STATUS AS A SCIENCE

This is James's (1892/1985) description of psychology as it appeared to him:

> A string of raw facts; a little gossip and a wrangle about opinions; a little classification and generalization on the mere

> descriptive level; a strong prejudice that we *have* states of mind, and that our brain conditions them: but not a single law in the same sense in which physics shows us laws, not a single proposition from which any consequence can causally be deduced.… This is no science, it is only the hope for a science. (p. 335)

More than 40 years later, Heidbreder (1933) offered her description of psychology:

> Psychology is, in fact, interesting, if for no other reason, because it affords a spectacle of a science still in the making. Scientific curiosity, which has penetrated so many of the ways of nature, is here discovered in the very act of feeling its way through a region it has only begun to explore, battering at barriers, groping through confusions, and working sometimes fumblingly, sometimes craftily, sometimes excitedly, sometimes wearily, at a problem that is still largely unsolved. For psychology is a science that has not yet made its great discovery. It has found nothing that does for it what atomic theory has done for chemistry, the principle of organic evolution for biology, the laws of motion for physics. Nothing that gives it a unifying principle has yet been discovered or recognized.… Its verified hypotheses form the established lines about which it sets its facts in order, and about which it organizes its research. But psychology has not yet won its great unifying victory. It has had flashes of perception, it holds a handful of clues, but it has not yet achieved a synthesis.… (pp. 425–426)

Have things improved in the more than 75 years since Heidbreder recorded her thoughts? As we saw in Chapter 1, after addressing the question of whether psychology is a science, Koch (1981, 1993) concluded that rather than psychology being a single discipline, it is several—some of which are scientific, but some of which are not. Koch believed that it would be more realistic to refer to our discipline as psychological studies rather than as the science of psychology. The designation *psychological studies* recognizes the diversity of psychology and shows a willingness to use a wide variety of methods while studying humans.

Accepting Koch's point, it still should be underscored that some psychologists are very much scientists. In Chapter 13 we noted the close association of individuals like Hull and Stevens with the most cutting-edge conceptions of science in their day. Likewise, the physiological psychology we reviewed in Chapter 18 is clearly linked to biology and neuroscience. Currently the National Science Foundation (NSF) classifies cognitive science (Chapter 19) among its priority areas. And despite the impact of postmodernism (which we will soon consider), Robinson (1993) asserts that "psychology now seems more intolerant than ever towards modes of inquiry and analysis that are not experimental, not grounded in so-called observables, not reducible to quantities, and not assessable statistically" (p. 642).

Staats (1989) offered his assessment of contemporary psychology as an admixture:

> Fields of psychology have developed as separate entities, with little or no planning with respect to their relationships. Research areas grow in isolation without ever being called on to relate themselves to the rest of psychology. There are various oppositional positions—nature versus nurture, situationism versus personality, scientific versus humanistic psychology—that separate works throughout the many problem areas of psychology. Different methods of study are employed and psychologists are divided by the methodology that they know and use and will accept. There are innumerable theories, large and small—it is said that there are 100–400 separate psychotherapy theories alone—and everyone is free to construct a personal theory without relating its elements to those in other theories. Many theoretical structures, which serve as the basis for empirical efforts, are taken from the common language as opposed to systematically

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> developed theories. The practice of constructing small common sense conceptual structures as the basis for one's specialized work in psychology provides an infinity of different and unrelated knowledge elements and associated methodological-theoretical structures. (p. 149)

Only rarely can a psychologist be found who believes that psychology *is* a unified discipline. Although, as an example, Matarazzo (1987) argues that a body of knowledge and basic processes and principles does form the core of psychology, and they have remained essentially the same for the last 100 years. Matarazzo believes that despite their seeming differences, various types of psychology (such as clinical, industrial, social, experimental, and developmental) actually apply the same core content, processes, and principles to different types of problems. Although in 1984 Kimble described psychology as consisting of two basically incompatible cultures, he recently expressed hope that psychology might become a unified discipline. Kimble (1996b) elaborated his vision of psychology as a unified science:

> The argument begins with a reminder that a science of psychology must obey the rules of science: it must be deterministic, empirical, and analytic. To honor those criteria, it must be some form of behaviorism, based on stimuli and response, because the sciences are about observable reality. (p. ix)

Kimble (1999) extended his argument that psychology's diverse elements could be reconciled using such a natural science model. The sociobiologist E. O. Wilson (1998; Chapter 18) also believes that differences within psychology can be reconciled, but within the framework of evolutionary theory. It is unlikely, however, that psychology's other culture, or cultures, would accept either Kimble's behavioral or Wilson's biological premise for unification.

Perhaps the approach toward unification suggested by Sternberg and Grigorenko (2001) is more promising:

> We believe that a more sensible and psychologically justifiable way of organizing psychology as a discipline and in departments and graduate study is in terms of psychological phenomena—which are not arbitrary—rather than so-called fields of psychology—which largely are arbitrary. Under this approach, an individual might choose to specialize in a set of related phenomena, such as learning and memory, stereotyping and prejudice, or motivation and emotion, and then study the phenomena of interest from multiple points of view. The individual thus would reach a fuller understanding of the phenomena being studied because he or she would not be limited by a set of assumptions or methods drawn from only one field of psychology. (p. 1075)

According to Sternberg and Grigorenko, it is the tendency of psychologists to identify with a specific perspective or methodology that creates unnecessary and unproductive diversity within psychology. This can be avoided by realizing that psychological phenomena are most effectively studied from a variety of perspectives. They offer the study of learning as an example:

> If one considers a basic psychological phenomenon, such as learning, one realizes that it can be studied in terms of an evolutionary paradigm, a brain-based biological paradigm, a cognitive paradigm, a behaviorist paradigm, a psychoanalytic paradigm, a genetic-epistemological paradigm, and so forth. There is no one correct perspective. Each perspective presents a different way of understanding the problem of learning. (p. 1075)

Following his term as APA President in 2003, Sternberg (2005) presented several strategies that could be used to accomplish the difficult task of unifying psychology. Still, we see that in the more than 100 years since James made his assessment of psychology, the situation has not significantly changed. Most would agree that psychology is still a collection of different facts, theories, assumptions, methodologies, and goals. It is still not clear how much of psychology can be scientific, and even those who believe psychology is a science debate over what type of a science it should be.

Some psychologists see psychology's diversity as necessary because of the complexity of humans and human endeavors. Others see it as a sign that psychology has failed to fully employ scientific methods. Still others say that psychology is diverse because it is still in the preparadigmatic stage that characterizes the early development of a science. Thus, psychology is characterized by diversity even regarding opinions about its diverse nature.

POSTMODERNISM

Psychology's status as a science features prominently in the current debate between modernism and postmodernism. **Premodernism** refers to the belief, prevalent during the Middle Ages, that all things, including human behavior, could be explained in terms of church dogma. The questioning of church authority began in the Renaissance and eventually led to more objective modes of inquiry. The Enlightenment ensued, and experience and reason were emphasized in the quest for knowledge. The terms **modernism** and Enlightenment have come to be used synonymously (Norris, 1995). The ideals of the Enlightenment began to be challenged by such philosophers as Hume and Kant (see Chapters 5 and 6), who demonstrated the limitations of human rationality. Also, romanticism and existentialism (see Chapter 7) can be viewed as a reaction against the Enlightenment belief that human behavior can be explained in terms of abstract universal laws or principles. Kierkegaard's claim that "truth is subjectivity" and Nietzsche's existential perspectivism are two clear examples of this opposition. Later, William James's concepts of radical empiricism and pragmatism (see Chapter 11) showed a similar disdain for universalism. In fact, James referred to absolutism as "the great disease of philosophical thought" (1890/1950, Vol. 1, p. 353).

Since about the mid-1960s, **postmodernism** (also called social constructionism and deconstructionism) has renewed the attack on Enlightenment ideals. In essence, the postmodernist believes that "reality" is created by individuals and groups within various personal, historical, or cultural contexts. This, of course, contrasts with the modernist (Enlightenment) belief that reality is some immutable Truth waiting to be discovered by experience, unbiased reason, or the methods of science. Postmodernism has much in common not only with romanticism, existentialism, and James's pragmatism, but also with the ancient philosophies of the Sophists and Skeptics. In Chapter 2 we noted that the Sophists believed that there was not one Truth but many truths, and these truths varied with individual experience. It was Protagoras who said, "Man is the measure of all things," thus anticipating much of postmodernism. In fact, Roochnik (2002) says, "The contemporary Sophist is called a postmodernist." In Chapter 3 we noted that the Skeptics questioned all dogmatism; that is, all claims of indisputable truth. What postmodernism shares with the Sophists, Skeptics, romantics, existentialists, and humanistic psychologists is the belief that "truth" is always relative to cultural, group, or personal perspectives. In fact, postmodernism has been referred to as a "radical relativism" (Smith, 1994). Fishman (1999) provides an overview of postmodernism:

> A core idea in postmodernism is that we are always interpreting our experienced reality through a pair of conceptual glasses—glasses based on such factors as our present personal goals in this particular situation, our past experiences, our values and attitudes, our body of knowledge, the nature of language, present trends in contemporary culture, and so forth. It is never possible to take the glasses off altogether and view the world as it "really is," with pure objectivity. All we can do is change glasses and realize that different pairs provide different pictures and perspectives of the world. (p. 5)

Berger and Luckmann's *The Social Construction of Reality* (1966) remains a seminal application of these ideas to the social sciences, but the roots of such contextualism in the philosophy of psychology run even deeper.

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Ludwig Wittgenstein

Postmodernists, especially those in psychology, find support for their position in the concept of **language games** proposed by the influential Austrian philosopher **Ludwig Wittgenstein (1889–1951)**. Like William James who was early on exposed to Thoreau and Emerson as family friends, Wittgenstein also grew up in wealth, with musicians such as Brahms, Mahler, and Strauss performing in his home. Whereas James' grandfather may have been the richest man in New York State, Wittgenstein's father was likely the second richest man in all of Europe. And where William's brother Henry was a famous novelist, Ludwig's brother Paul was an equally famous pianist.

Also like James, Wittgenstein was first educated by private tutors, then at the finest of European schools. A mechanical prodigy, his initial college work was in mechanical and aeronautical engineering, but over time he was drawn to mathematics and philosophy. He studied at Cambridge with Bertrand Russell, then served as a foot soldier (and POW) during WW I. Following the war, he worked at various times as a gardener, school teacher, and architect, and also became interested in Gestalt psychology (via Karl Bühler). Eventually he was persuaded by some of Europe's leading intellectuals to return to Cambridge in 1929. His first book had already become so influential it was accepted in lieu of the PhD, and he joined the faculty.

Although some students adored and idolized him, others found his courses vexing and the man terrifying. He threw Turing (Chapter 19) out of his class and threatened Popper (Chapter 1) with a poker following a symposium. Never perfectly suited for Cambridge academia, Wittgenstein resigned not long after WW II. He died of prostate cancer just a few years later. His most important work for psychology, *Philosophical Investigations* (1953/1997), was published posthumously.

Language Games. Wittgenstein argued that the only meaning that terms and concepts have is that which is assigned to them within a community of users. According to Wittgenstein, language is a tool used by members of a community to communicate with one another. Each community determines the meaning of its own language and determines the rules according to which language is used. That is, each community creates its own *language games*, which, in turn, reflects its own "form of life."

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Ludwig Wittgenstein

Wittgenstein did not employ the term *game* in a frivolous sense. To understand a community is to understand its language games. Wittgenstein (1953/1997) provided a partial list of language games that can characterize a community; they include the accepted ways of giving and obeying orders, describing and measuring objects, reporting and speculating about events, forming and testing hypotheses, making up and reading stories, acting, singing, telling jokes, solving problems, asking questions, cursing, greeting, and praying.

For Wittgenstein, then, it is wrong to view language as reflecting a mind-independent reality. Instead, he said, language *creates* reality. Thus he, like the postmodernists, rejected the "correspondence theory of truth" (see Chapter 1). Wittgenstein didn't deny the existence of a physical world nor that our senses bring us into contact with that world. Rather, he argued that people can, and do, give their experiences a wide variety of meanings. Sluga and Stern

(1996) give a good example: "A coin is currency, but that doesn't destroy its reality as a metal disc existing independently of our belief in it" (p. 359).

Furthermore, there must be regularity to our experience of the physical world for language games to have meaning, Wittgenstein gives, as an example, the weighing of a commodity to determine its buying and selling price: "The procedure of putting a lump of cheese on a balance and fixing the price by the turn of the scale would lose its point if it frequently happened for such lumps to suddenly grow or shrink for no obvious reason" (1953/1997, p. 56).

According to Wittgenstein, most, if not all, disputes among philosophers and psychologists could be resolved by understanding that different philosophical and psychological paradigms reflect their own language games. As noted in Chapter 19, the psychology of language during this time was largely the province of linguists, such as Wittgenstein's Cambridge colleague C. K. Ogden, or of philosophers, such as Wittgenstein's contemporary at Oxford, **Gilbert Ryle (1900–1976)**. It was Ryle who first turned the phrase, "ghost in the machine," as part of his coverage of the mind–body problem in his book, *The Concept of Mind* (1949).

In addition to his 24-year stint as editor of *Mind*, the journal founded by Alexander Bain (Chapter 5) in 1876, Ryle is also famous for his distinction between *knowing how* and *knowing that* as it applies to human reasoning. For example, I know *that* salt improves the taste of french fries. But, I do not know *how* the salt reacts with the potatoes' oils or biochemically stimulates my tongue to affect their taste. Additionally, Ryle (1949) makes a point similar to Wittgenstein about how the use of language relates to disputes in philosophy—such as the mind–body problem. Consider:

> A foreigner visiting Oxford or Cambridge for the first time is shown a number of colleges, libraries, playing fields, museums, scientific departments and administrative offices. He then asks "But where is the University? I have seen where the members of the Colleges live, where the Registrar works, where the scientists experiment and the rest. But I have not yet seen the University in which reside and work the members of your University." It has then to be explained to him that the University is not another collateral institution, some ulterior counterpart to the colleges, laboratories and offices which he has seen. The University is just the way in which all that he has already seen is organized. (p. 16)

For Ryle, this was exactly the essence of the mind–body problem. Just as the foreigner was misguided in his search for the University among the playing fields and administrative offices, so too is the philosopher or psychologist misguided in looking for the mind amid various brain structures and human actions. For Wittgenstein too, the great philosophical debates that occurred over the centuries were not over conflicting realities but over conflicting language games. Likewise, the traditional debates over materialism versus idealism, free will versus determinism, rationalism versus empiricism, nominalism versus realism, and science versus nonscience are, according to Wittgenstein, debates over linguistic practices.

What then is the role of philosophy? According to Wittgenstein, "Philosophy is a battle against the bewitchment of our intelligence by means of language" (1953/1997, p. 47). In agreement with Wittgenstein, Gergen (2001) says, "Theoretical accounts of the world are not mirror reflections of the world but discursive actions within a community" (p. 811). It should be clear that Kuhn's philosophy of science (see Chapter 1) has much in common with Wittgenstein's philosophy. In fact, Kuhn stated in his highly influential *The Structure of Scientific Revolutions* (1996): "Scientific knowledge, like language, is intrinsically the common property of a group or else nothing at all. To understand it we shall need to know the special characteristics of the groups that create it" (p. 20).

Family Resemblance. Beginning with Socrates, Plato, and Aristotle and continuing through Scholasticism to the present, there have been philosophers who believed that to be a member of a category required the possession of some

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defining characteristic. That is, to be a member of a category, an instance must manifest the essence or defining features of that category. Wittgenstein rejected this argument.

Once again, Wittgenstein beckons us to observe how words are actually used within a community. As an example, he describes the numerous activities we refer to as "games" (1953/1997, pp. 31–32). He notes that there are board games, card games, ball games, and Olympic games, among others. Some require considerable intellectual or physical skill, others less. Some can be played alone; others cannot. Some involve winning and losing; others do not. What is the common element among these activities that make them all games? According to Wittgenstein, there is none. Instead, they are related in the same way that family members are related. Family members may share many characteristics. For example, they may tend to have similar eyes, noses, chins, heights, hair colors, temperaments, gaits, and so forth. However, not all family members share the same characteristics. A child may have its father's eyes and its mother's hair. Another child may have its grandmother's sense of humor and its uncle's chin, and so forth. In other words, there is a cluster of traits that "overlap and crisscross" within a family, but there is no essence or universal characteristic shared by all family members. So it is with games, and most all other concepts. For Wittgenstein, then, the search for essences or universals is doomed to failure. Thus, Wittgenstein replaced the traditional concept of essence with that of **family resemblance**. Games are games, horses are horses, and beautiful things are beautiful things not because each instance of such things reflects a universal essence but because there is a family resemblance among them.

Noted in Chapter 19, Eleanor Rosch (for example, Rosch & Mervis, 1975; see also Barsalou, 1985; Neisser, 1987) found empirical support for Wittgenstein's contention that family resemblances, not defining features (essences), are utilized in human categorization. Subsequent work by linguists such as George Lakoff (for example, 1987) provided additional support for the relationship between language, and the categories and schemata that we use to make sense of our perceptions. Such ideas have also served to move our understanding of thought closer to the connectionist paradigm (see, for example, Barsalou's, 1983, work on *ad hoc* categories).

Indeed, according to Wittgenstein, there is also little to be discovered by rational analysis. Wittgenstein believed matters should be descriptive rather than theoretical, saying, "We must do away with all *explanation* and description alone must take its place" (1953/1997, p. 47) and "Philosophy simply puts everything before us, and neither explains nor deduces anything. Since everything lies open to view there is nothing to explain. For what is hidden … is of no interest to us" (1953/1997, p. 50). Stroll (2002) summarizes Wittgenstein's position as follows:

> Wittgenstein is urging that one compare and contrast cases in order to see how words like "number," "game," and "tool" are used in ordinary life. The method is applicable to all concepts traditional philosophers have explored. It replaces the search for the essence of things and the need to "penetrate phenomena" by an example-oriented, case by case description of the uses of words. (p. 116)

Both Wittgenstein and the postmodernists agree that what is considered "true" within one community may not have validity beyond the community that defined it as such. Gergen (1994) gives an example:

> We are urged to consider, for example, the effects on the culture of such terms as *depression*, defined as a psychological disorder, reified in our measures, and treated chemically. How is it that peoples in other cultures and preceding centuries manage(d) without such a concept, yet contemporary psychologists detect depression in all corners of society (now even in infants), and over six million Americans now "require" Prozac? What professions stand to profit by this particular set of constructions and practices? Is it possible that the public has served as an unwitting victim? (p. 414)

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In other words, according to Gergen (and others, for example, Szasz from Chapter 15), it is possible that a psychological community has created the concept of depression, and other forms of "mental illness" because doing so has meaning, and benefits, for members of that community.

The tension between modernism and postmodernism continues in contemporary psychology. When psychology became a science in the late 19th century, it sought the laws that govern the human mind. The goal was to understand the human mind in general, not in particular. Techniques and theories have changed through the years, but the desire for general laws governing human conduct has seldom waned. This belief that science can unveil the truth about human nature has been, and is, a major theme in the history of psychology. For the scientifically inclined psychologist, the methods used to understand human behavior are the same as those used by the natural scientists to understand the physical world.

Postmodernism doubts the primacy of this natural science model. Psychologists embracing postmodernism see science as only one approach, among many, to understanding humans. In any case, a sometimes heated debate between modernism and postmodernism exists in contemporary psychology. Even the approach to unifying psychology suggested by Sternberg and Grigorenko (2001; discussed earlier) is colored by postmodernism. For arguments in favor of postmodernism, see, for example, Gergen (1991, 1994, 2001). For compromise positions involving postmodernism, see, for example, Fishman (1999) or Schneider (1998). For arguments against postmodernism, see, for example, Smith (1994).

IS THERE ANYTHING NEW IN PSYCHOLOGY?

No doubt, some aspects of psychology are newer and better than they have ever been. A number of techniques have been developed that have vastly increased our ability to study brain functioning. These techniques include electroencephalography (EEG), magnetic resonance imaging (MRI), computerized tomography (CT), and positron emission tomography (PET). Also, a variety of new drugs have provided psychobiologists with powerful research tools. In addition to their involvement in biological research and their use as a model for understanding cognitive processes, computers allow for complex data analysis that only a few years ago would have been impossible. So the answer to the question, Is there anything new in psychology? must be yes. But note that our examples are all technological rather than conceptual. When we look at the larger issues, the answer to our question seems less certain. Throughout psychology's history, emphases have changed and research tools have improved, but in many ways psychology is still addressing the same questions it has addressed since its inception. Because we elaborated on psychology's persistent questions and issues in Chapter 1, we will reprise them here:

- What is the nature of human nature?
- How are the mind and body related?
- To what extent are the causes of human behavior innate (nature) as opposed to experiential (nurture)?
- To what extent, if any, is human behavior freely chosen as opposed to completely determined?
- Is there some vital (nonmaterial) force in human nature that prevents a completely mechanistic explanation of human behavior?
- To what extent do the irrational aspects of human nature (for example, emotions, intuitions, and instincts) contribute to human behavior as opposed to the rational aspects?
- How are humans related to nonhuman animals?
- What is the origin of human knowledge?
- To what extent does objective (physical) reality determine human behavior as opposed to subjective (mental) reality?
- What accounts for the unity and continuity of experience?

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- Are there knowable universal truths about the world in general or people in particular, or must truth always be relative to an individual or group perspective?

Psychology's persistent questions are essentially philosophical questions, and the following point made by Bertrand Russell (1945) pertains to the major questions addressed by both philosophy and psychology:

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In his book *The Limits of Science* (1985), Medawar agrees with Russell that science's ability to answer certain questions is unequaled, but there are crucial questions that science cannot answer. Medawar argues that such questions are more appropriately addressed by philosophy, or even—contrary to Russell—by theology.

As seen in Chapter 1, Popper said that there are no final truths even in science. The highest status that a scientific explanation can have is "not yet disconfirmed." Although Popper and Kuhn differed in their basic conceptions of science, both believed in the dynamic nature of "scientific truth." Kuhn said, "All past beliefs about nature have sooner or later turned out to be false. On the record, therefore, the probability that any currently proposed belief will fare better must be close to zero" (Kuhn, 2000b, p. 115). All explanations, even scientific explanations, will eventually be found to be false; the search for truth is unending. Thus, instead of being disheartened about what implications all this holds for psychology, consider that the important questions, whether approached philosophically or scientifically, must be persistent questions.

It also appears that through the centuries, philosophers, theologians, and psychologists have discovered partial truths about humans, but have confused them with the whole Truth. When these individuals were convincing and the time was right, their ideas became popular enough to grow into schools. Perhaps to ask whether the voluntarists, structuralists, functionalists, behaviorists, Gestaltists, psychoanalysts, or the humanistic psychologists were right or wrong is simply a bad question. A better question might be, How much of the truth about humans was captured by each of these viewpoints? To some degree they were all partially correct, and no doubt there are many other truths about humans not yet revealed by any viewpoint. As Jung (1921/1971) said,

> The assumption that only *one* psychology exists or only *one* fundamental psychological principle is an intolerable tyranny, a pseudo-scientific prejudice.… Even when this is done in a scientific spirit, it should not be forgotten that science is not the *summa* of life, that it is actually only … one of the forms of human thought. (p. 41)

Where does this leave the student of psychology? Psychology is not a place for people with a low tolerance for ambiguity. The diverse and sometimes conflicting viewpoints that characterize contemporary psychology will undoubtedly continue to characterize psychology in the future. There is growing recognition that psychology must be as diverse as the humans whose behavior it attempts to explain. For those looking for the "one truth," this state of affairs is distressing. Heraclitus believed that "all things are born in flux." If he were a freshman at your school, he would surely be a psychology major.

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SUMMARY

Contemporary psychology is a diverse discipline that reflects a wide variety of influences. Psychology's great diversity is shown in the 54 divisions of the APA. From its inception, there was tension within psychology between those wanting it to be purely scientific and those seeking to apply psychological principles to the solution of practical problems. When the APA was founded in 1892, its goal was to promote psychology as a science; however, most of the charter members were also sympathetic toward applied psychology. One exception was Titchener who, like his mentor Wundt, had disdain for applied psychology.

The clinical psychology founded by Witmer in 1896 had little in common with modern clinical psychology. Until World War II, the primary function of clinical psychologists was to administer psychological tests and evaluate test performance. As the emphasis on testing grew, so did the tension between pure, scientific and applied psychologists. Other applied psychologists worked on industrial or military applications.

Because large numbers of World War II veterans needed psychotherapy, the Veterans Administration funded programs to train psychologists as psychotherapists. Gradually, psychotherapy became the primary function of clinical psychologists. As the number of applied psychologists (such as clinicians) increased, they began creating their own organizations independent of the APA through which to pursue their professional interests. Eventually, the APA reacted by creating divisions that reflected both scientific and applied interests. As applied psychologists had earlier, eventually scientific psychologists began to perceive themselves as second-class members of the APA, and reacted by creating their own organizations. The tension between scientific psychologists and applied psychologists also manifests itself in the current controversy concerning the training of clinical psychologists. One view is that clinical psychologists should receive the same rigorous training as does any other PhD in psychology. That is, clinicians should be scientist-practitioners. The other view is that clinical psychologists should be trained exclusively in the professional application of the discipline. That is, clinicians should earn PsyDs. As clinical psychologists entered the realm of psychotherapy, they were brought into conflict with psychiatrists, and numerous court battles ensued concerning the rights of clinical psychologists. With the granting of prescriptive privileges to clinical psychologists in New Mexico and Louisiana, the services legally provided by psychiatrists and psychologists in those states are essentially the same.

James noted that a philosopher's temperament inclines him or her toward tender-minded (subjective) philosophy or tough-minded (objective) philosophy. The scientist-novelist C. P. Snow observed that the values accepted by scientists and those accepted by individuals in the humanities are so distinct as to reflect two separate cultures.

In 1892 James concluded that psychology was still hoping to become a science. More recently, Koch argued that although some aspects of psychology are scientific, others are not. Also, Staats observes that psychology is a disunified discipline. Several suggestions have been offered as to how psychology might become a unified discipline, but contemporary psychology remains highly diversified.

Premodernism refers to the belief held during the Middle Ages that religious dogma explains everything. Starting with the Renaissance humanists, religious authority was questioned and modernism, or the Enlightenment, ensued. Stimulated by the work of such individuals as Newton, Bacon, and Descartes, a search for the universal laws or principles governing human behavior began. Modernism embraced objective rationality and empirical observation in its search for truth and came into full fruition in empiricism and positivism. In time, philosophers demonstrated limitations in the ability of humans to understand physical reality, and the ideals of modernism began to be questioned. For example, the romantic and existential philosophers questioned whether human behavior could be explained in terms of universal, abstract principles. Instead they embraced perspectivism, saying that "truth" is determined by individual or group circumstances. This belief in the relativity of truth ushered in postmodernism. The relativistic position of postmodernism found support in Wittgenstein's concept of language games. According to Wittgenstein, each community creates the meaning of its own language and, therefore, to understand a language one must understand how it is used within the community that created it. For Wittgenstein, philosophical disputes reflect conflicting language games, and it is the job of philosophy to clarify this fact. Wittgenstein also sought to replace the ancient philosophical concept of essence with that of family resemblance. For him, membership in a category can be attained by the possession of one or more features from a set, or family, of features; not just by possessing features considered essential.

In a broad sense, psychology continues to respond to questions that the early Greek philosophers posed. Although the emphases have changed—as well as research tools and terminology—psychology continues to address the same issues and questions that it has always addressed. It may be that psychology's persistent issues and questions are philosophical in nature and therefore have no final answers. According to Popper, even if psychology's persistent questions are scientific rather than philosophical, they may still have no final answers and, on this point, Popper and Kuhn were in agreement. It is also possible that various philosophies and psychological schools have provided only partial truths about human nature and that many more truths will be forthcoming. For those with a high tolerance for ambiguity, psychology is and will continue to be an exciting discipline.

DISCUSSION QUESTIONS

1. What evidence supports the claim that contemporary psychology is highly diverse? What accounts for this diversity?
2. Summarize the history of the controversy concerning psychology as a pure, scientific discipline as opposed to an applied discipline.
3. What was the primary function of clinical psychologists before World War II? After World War II?
4. Discuss the steps taken by the APA through the years to reduce the tension between pure, scientific psychology and applied psychology.
5. Discuss some of the conflicts between clinical psychologists and psychiatrists?
6. Summarize the arguments for and against the PsyD degree.
7. Support or refute Kimble's contention that contemporary psychology consists of at least two incommensurable cultures.
8. Is psychology a science? Summarize the various answers to this question reviewed in this chapter.
9. What characterized premodern philosophy and psychology? Also, what is modernism?
10. Define postmodernism and give examples of how postmodernist thinking has manifested itself throughout the history of psychology.
11. Describe the relevance of Wittgenstein's concept of language games to postmodernism.
12. How, according to Wittgenstein, are traditional philosophical debates best understood and resolved?
13. Explain Ryle's point about the foreigner visiting the University.
14. Discuss Wittgenstein's concept of family resemblance.
15. Why are psychology's persistent questions so persistent?

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GLOSSARY

Doctor of Psychology (PsyD) The doctoral degree in clinical psychology that emphasizes training in the professional application of psychological principles rather than in scientific methodology.

Eclecticism The willingness to employ the most effective methods available in solving a problem.

Family resemblance Wittgenstein's contention that a category does not have a defining feature (essence) that must be shared by all members of the category. Rather, there is a set of features distributed among members of a category, with no single feature essential for inclusion in the category.

Hawthorne Effect The finding that when employees knew that they were being observed and that work place changes were being made to improve their productivity, that it did improve productivity, no matter what those changes were.

Language games According to Wittgenstein, the linguistic conventions that guide activities within a community. Taken collectively, language games describe a community's "form of life."

Modernism The belief that improvement in the human condition can come about only by understanding and applying the abstract, universal principles that govern the universe (including human behavior). In the search for these principles, unbiased rationality and empirical observation were emphasized. The period during which this belief prevailed is called the Enlightenment.

Postmodernism Opposes the search for abstract, universal laws or principles thought to govern human behavior. Instead of being governed by abstract, universal laws or principles, human behavior, say the postmodernists, can be understood only within the cultural, group, or personal contexts within which it occurs.

Premodernism The belief that prevailed during the Middle Ages that all things, including human behavior, can be explained in terms of religious dogma.

Ryle, Gilbert (1900–1976) English philosopher of psychology and long time editor of *Mind*. His book *The Concept of Mind* (1949) provided an explanation of the mind–body problem as related to the language used.

Weltanschauung Worldview or world-design.

Wittgenstein, Ludwig (1889–1951) Argued that philosophical debates are over the meaning of words rather than over some truth or truths that exist independently of linguistic conventions. In other words, he argued that philosophical debates are over language games. He also argued that the ancient concept of essence should be replaced by the concept of family resemblance. (*See also* **Family resemblance** and **Language games**.)

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